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ORIGINAL

FLOOD INSURANCE STUDY

COMPLETED 56

CITY OF INDEPENDENCE, MISSOURI
(JACKSON AND CLAY COUNTIES)

REVISED:

JUNE 15, 1987

Federal Emergency Management Agency

COMMUNITY NUMBER - 290172

NOTICE TO
FLOOD INSURANCE STUDY USERS

Individual components of this Flood Insurance Study (i.e., text, tables, profiles, and maps) are subject to revision as additional data become available. Because revised components may be issued separately, study users should consult the community map repository for those components that are currently effective.

In cases where this Flood Insurance Study and any components thereof warrant revision, a Revisions Description section may be incorporated into this text. When applicable, study users should refer to the Revisions Description to obtain pertinent data and information concerning revisions.

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PUBLISHED SEPARATELY:

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FLOOD INSURANCE STUDY

1.0 INTRODUCTION

1.1 Purpose of Study

The purpose of this Flood Insurance Study is to investigate the existence and severity of flood hazards in the City of Independence, Clay and Jackson Counties, Missouri, and to aid in the administration of the Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973. Initial use of this information will be to convert the City of Independence to the regular program of flood insurance by the Federal Insurance Administration. Further use of the information will be made by local and regional planners in their efforts to promote sound land use and flood plain development.

1.2 Coordination

The Kansas City District, U.S. Army Corps of Engineers, provided necessary floodway data, information for frequency-discharge drainage area curves, and descriptions of engineering methods.

The United States Geological Survey supplied 7.5-Minute Series topographic quad sheets from which base maps in this report were made. The USGS also provided Flood-Prone Quads which were used for approximate study areas.

The firm of Black and Veatch of Kansas City, Missouri, supplied reference mark information.

1.3 Authority and Acknowledgements

This Flood Insurance Study was conducted by the U.S. Army Corps of Engineers, Kansas City District, at the request of the Federal Insurance Administration. The source of authority for the Study is the National Flood Insurance Act of 1968, as amended. Authority and acknowledgements are contained in Interagency Agreement No. IAA-H-2-73, Project Order No. 4.

2.0 AREA STUDIED

2.1 Scope of Study

This Flood Insurance Study covers the incorporated area of the City of Independence, Missouri. The City of Independence is located in

Jackson and Clay Counties in the northwest section of the State. Not included in the Study is the Lake City Army Ammunition Plant. The area of study is shown on the Vicinity Map (Figure 1).

The incorporated area of the City of Independence is not defined by any natural boundaries. The Little Blue River, a tributary to the Missouri River, flows in a northerly direction through the eastern third of the City. In the western two-thirds of the City, there is much development. The streams located in this area that have been studied in detail are: Rock Creek, Sugar Creek, the North Fork of Sugar Creek, Mill Creek, the Middle and East Forks of Mill Creek, Adair Creek, Crackerneck Creek, the North Fork of Crackerneck Creek, Spring Branch, the North and South Forks of Spring Branch, and Bundschu Creek. There has been very little development in the eastern third of the City. Nevertheless, the Missouri River has been studied in detail and the other creeks located within this area have been studied by approximate methods. The names of these watercourses are: the Little Blue River, the East Fork of the Little Blue River, Burr Oak Creek, West Fire Prairie Creek, and Fire Prairie Creek. Some small lakes and ponds throughout the City were also studied by approximate methods. The areas studied in detail were chosen without any consideration given to the effects of future conditions.

2.2 Community Description

Independence, Missouri, the County Seat of Jackson County and the fourth largest city in the State, is traversed by three principal watercourses--the Blue and Little Blue Rivers and Rock Creek, a small but notable stream that forms its headwaters in southwest Independence and flows north into the Missouri River just above the mouth of the Blue River. Independence is located just southeast of Kansas City.

When the Town of Independence was founded in 1824, homesteaders, attracted by abundant resources and fertile soil, made their way from Kentucky, Tennessee, and Virginia to what was soon to become one of the major outfitting posts in the midwest. Rock Creek was a significant landmark to thousands of these travelers due to its stable, rocky bed that could easily be forded. By 1841 the California, Oregon, and Santa Fe Trails were in full operation. A commercial boom resulted because Independence was the last point of civilization before crossing the Rocky Mountains. In 1849, citizens built the first railroad west of the Mississippi. Today Independence has grown to a city of 11,662 (1970 census).

Diversified topography prevails in the City of Independence, from low marshes to high wooded land. The climate is typical of the midwest region of the United States with wide fluctuation in temperature, precipitation, and humidity. Frequent weather changes occur both

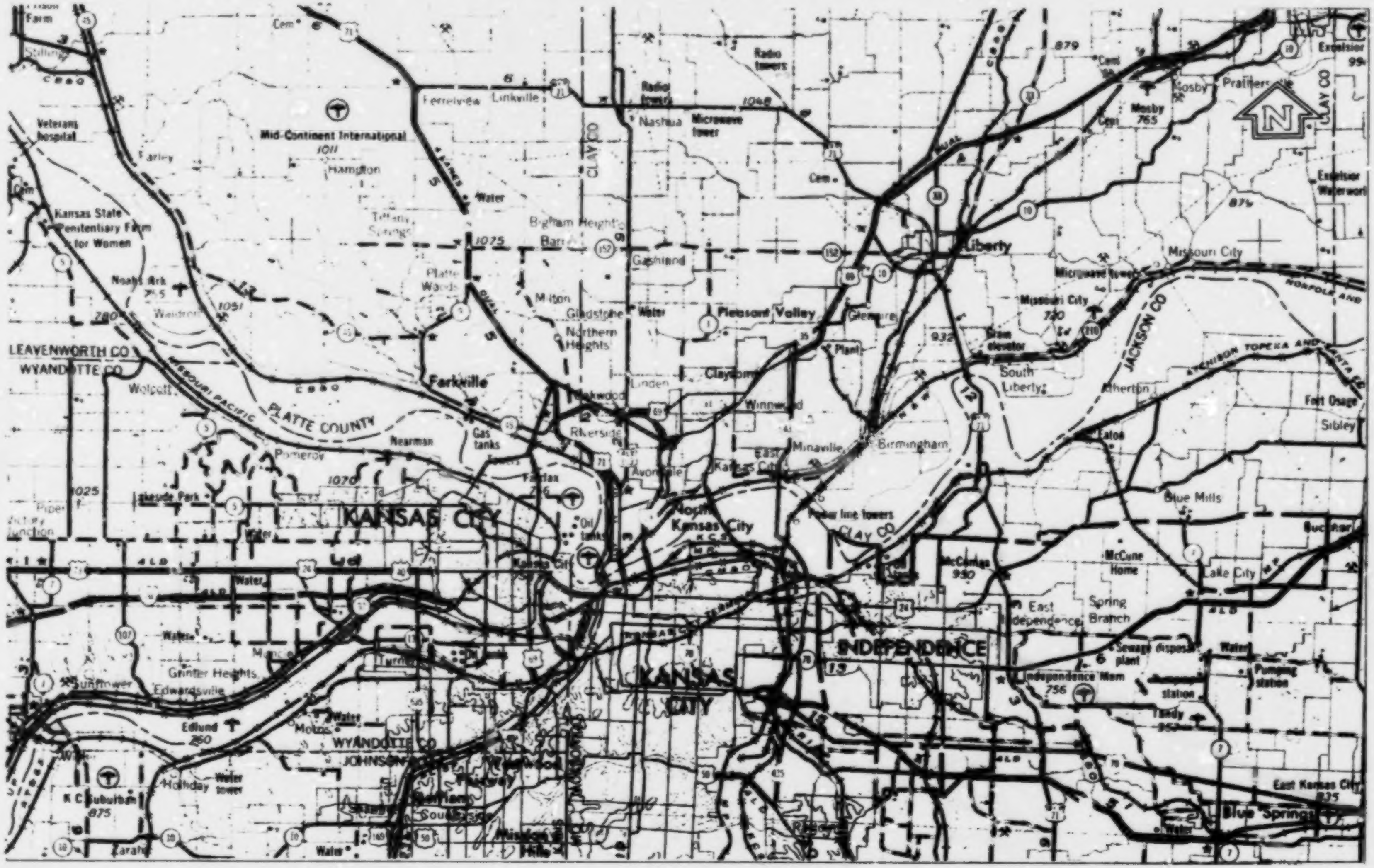

Farm
Stillings
Cem
Ferrelview
Linkville
Veterans Hospital
Mid-Continent International
1011
Hampton
Farley
Kansas State Penitentiary Farm for Women
Tiffany Springs
Water
Bigham Heights
Barry
Gashland
CLAY CO
Radio towers
Radio towers
Nashua
Microwave tower
1048
879
Cem
Mosby
765
Prathersville
Excelsior
Excelsior Waterworks
CLAY CO
876
Liberty
Missouri City
Microwave tower
Missouri City
720
Grain elevator
NORFOLK AND
JACKSON CO
ATCHISON TOPEKA AND SANTA FE
South Liberty
Atherton
Fort Osage
Sibley
Noahs Ark
755
Waldron
1051
780
1075
Platte Woods
Milton
Gladstone
Northern Heights
Water
Pleasant Valley
Glenaire
Plant
932
Claycomo
Linden
Oakwood
Winnwood
LEAVENWORTH CO
WYANDOTTE CO
Wolcott
CB&Q
Parkville
PLATTE COUNTY
MISSOURI PACIFIC
Riverside
Minaville
Birmingham
Eaton
Gas tanks
Nearman
Pomeroy
Avondale
East Kansas City
Fairfax
Lakeside Park
1070
1025
Piper
Victory Junction
KANSAS CITY
Oil tanks
North Kansas City
Power line towers
CLAY CO
Blue Mills
Buckner
McCune Home
Lake City
McCoy
950
Water
Kansas City
East Independence
Spring Branch
INDEPENDENCE
Sewage disposal plant
Water
Pumping station
Muncie
Grinter Heights
Edwardsville
Sunflower
Turner
KANSAS CITY
Independence Mem
756
Tandy
952
Edlund
260
Welborn
Muncie
WYANDOTTE CO
JOHNSON CO
Holliday
Water tower
K C Suburban
875
Zarah
Water
Mission Hills
East Kansas City
835
Blue Springs
Water

FIGURE 1

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF INDEPENDENCE, MO

(CLAY AND JACKSON COS

APPROXIMATE SCALE

0 4 8 12 16 MILES

VICINITY MAP

from day to day and season to season. Summer precipitation generally results from thunderstorm activity of high intensity and limited extent, sometimes accompanied by hail. However, widespread rainfalls of moderate to heavy intensities with varied durations are not uncommon and can develop at any time of the year. Hourly rainfalls such as the 1.12 inches recorded on July 2, 1969 at Kansas City are of common occurrence in this area.

Vegetation varies throughout the area but much of the heavy vegetation is located close to and along stream banks.

The flood plains abound with residential developments with some areas of industrial development and public utilities. Numerous city streets, state highways and rail lines cross the flood plains. Continuing economic development within the study area is expected and pressures leading to intensified flood plain use will undoubtedly accompany such development.

2.3 Principal Flood Problems

The flood producing characteristics of the streams in the City of Independence are typical of small watersheds in the midwest region of the United States. Past flood flows have usually been caused by short duration thunderstorms having high intensity rainfall. These storms, lasting from a few minutes to several hours, generally move rapidly over the area releasing cloudburst type rains. Flood flows from these storms are characterized by high peaks, high velocities, short duration and relatively small volumes of runoff. Most of the flood producing storms in the Independence area have occurred from March through October every 1-2 years.

Major obstructions to flood flow have been created by man's continued encroachment on the flood plain by development. The many bridges spanning small streams in the area have also reduced the available area of flow for floodwaters. In addition, debris collecting at bridges has further constricted the flow area. Fences spanning the channel have been debris collectors in past events, thus increasing upstream water surfaces during floods.

An important feature of the lower basin of the Little Blue River is the Lake City Army Ammunition Plant. The plant occupies a preglacial course of the Little Blue River known as Fire Prairie Creek.

Due to a lack of a natural flood plain boundary, a portion of overbank floodwaters from the Little Blue River enters the reservation area along its western boundary. The overflow follows the Fire Prairie Creek channel northeasterly down the Fire Prairie Creek Valley to the Missouri River.

2.4 Flood Protection Measures

Historically, damages incurred as a result of flooding in the Blue River basin were limited mainly to agriculture. The current influx of urbanization is being preceded by a comprehensive prevention program sponsored by Jackson County. Presently, the Little Blue River stream channel is being enlarged and modified from Blue Mills Road to Missouri Highway 78 by the Corps of Engineers as part of the Little Blue River Flood Control Project. In addition, the channel segment from Missouri Highway 78 to R. D. Mize Road will be under construction shortly. Eventually improvement of the channel will extend through the city. Two flood control reservoirs are also planned as part of the project. Other smaller streams have no planned flood damage prevention programs other than occasional cleaning of debris from culverts. The City of Independence is currently planning a recreational dam and reservoir on one of the tributaries of Spring Branch. However, this facility is not designed for flood control.

In the northeastern corner of the city, levees have been built to contain portions of Fire Prairie Creek.

The National Oceanic and Atmospheric Administration provides no specific flood warning for small tributaries in the Independence, Missouri area. The principal service that can be provided is a general alert to the danger of flash flooding. This alert is transmitted over Weather Bureau teletype facilities to the mass media and to city and county officials.

3.0 ENGINEERING METHODS

For streams studied in detail in the community, standard hydrologic and hydraulic study methods were used to determine the flood hazard data required for this study. Floods having recurrence intervals of 10, 100, and 500 years have been selected as having special significance for the land use and flood insurance applications of the flood insurance program. The analyses reported here reflect current conditions in the watersheds of the streams.

3.1 Hydraulic Analyses

Hydrologic analyses were carried out to establish the peak-discharge frequency relationships for floods of the selected recurrence intervals for each stream studied in detail in the county. Peak discharge frequency analysis was based on information taken from "Generalized Flood Frequency Estimates for Urban Areas in Missouri" (Reference 1). This is a regionalized approach for the State of Missouri which reflects the effects of urbanization and storm drainage systems.

Discharges for the 500-year floods of all streams studied in detail were determined by straight line extrapolation of a single-log graph of flood discharges computed for frequencies up to 100 years.

Drainage area-peak discharge relationships for streams in the City of Independence are shown in Figure 2.

3.2 Hydraulic Analyses

Analyses of the hydraulic characteristics of streams in the community are carried out to provide estimates of the elevations of floods of the selected recurrence intervals along each stream studied in detail.

Water-surface elevations of the floods of selected recurrence intervals were computed through the use of the Corps of Engineers (COE) HEC-2 step-backwater computer program (Reference 2). Field surveyed cross sections were used for the backwater analysis with intermediate cross sections being supplemented by 5-foot contour mapping. Cross sections were located at close intervals above and below bridges and culverts in order to compute the significant backwater effects of these structures. Locations of selected cross sections used in the hydraulic analyses are shown on the Flood Boundary and Floodway Map.

Flood profiles for streams studied in detail were drawn showing computed water-surface elevations to an accuracy of 0.5 foot for floods of the selected recurrence intervals of 10, 100, and 500 years. All elevations are measured from National Geodetic Vertical Datum of 1929 (NGVD). Elevation reference marks used in this study are shown on the maps.

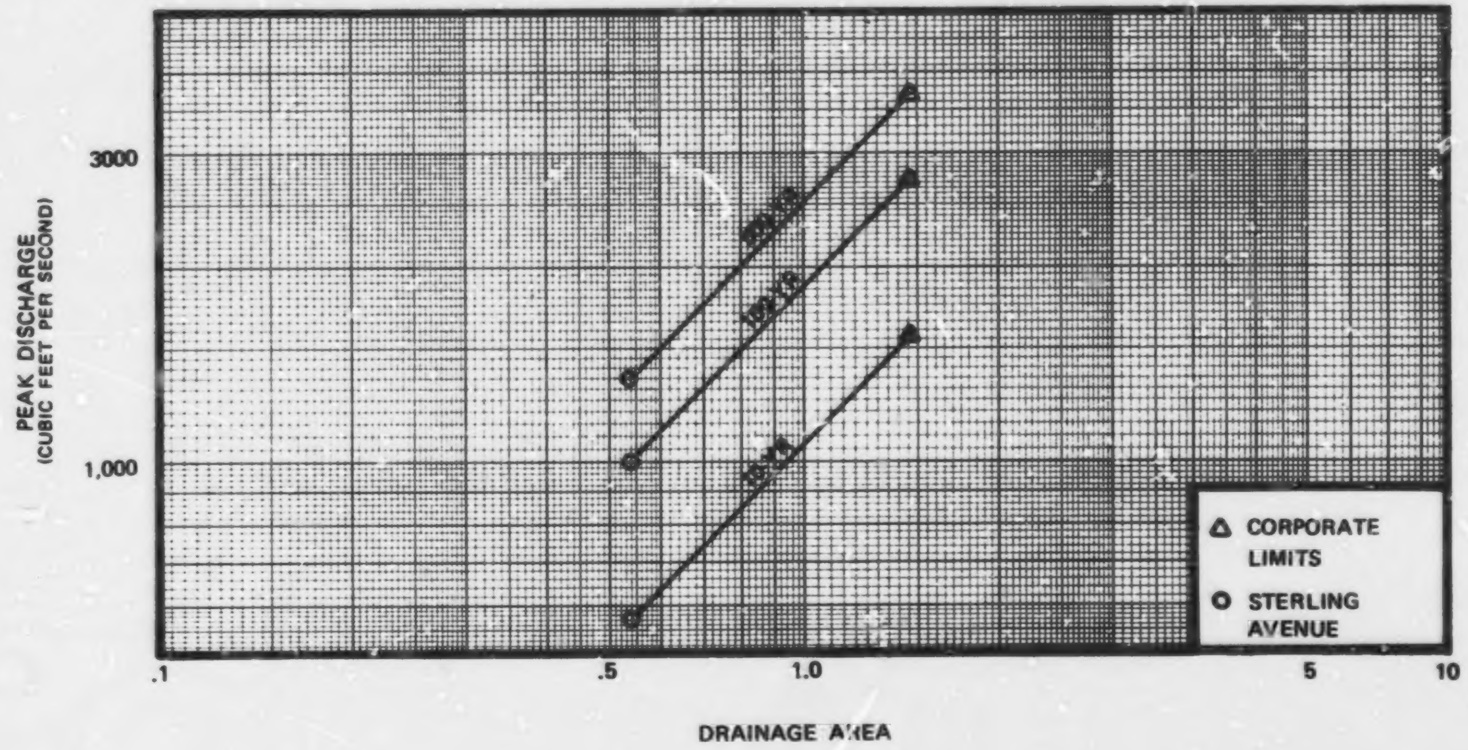


FIGURE 2

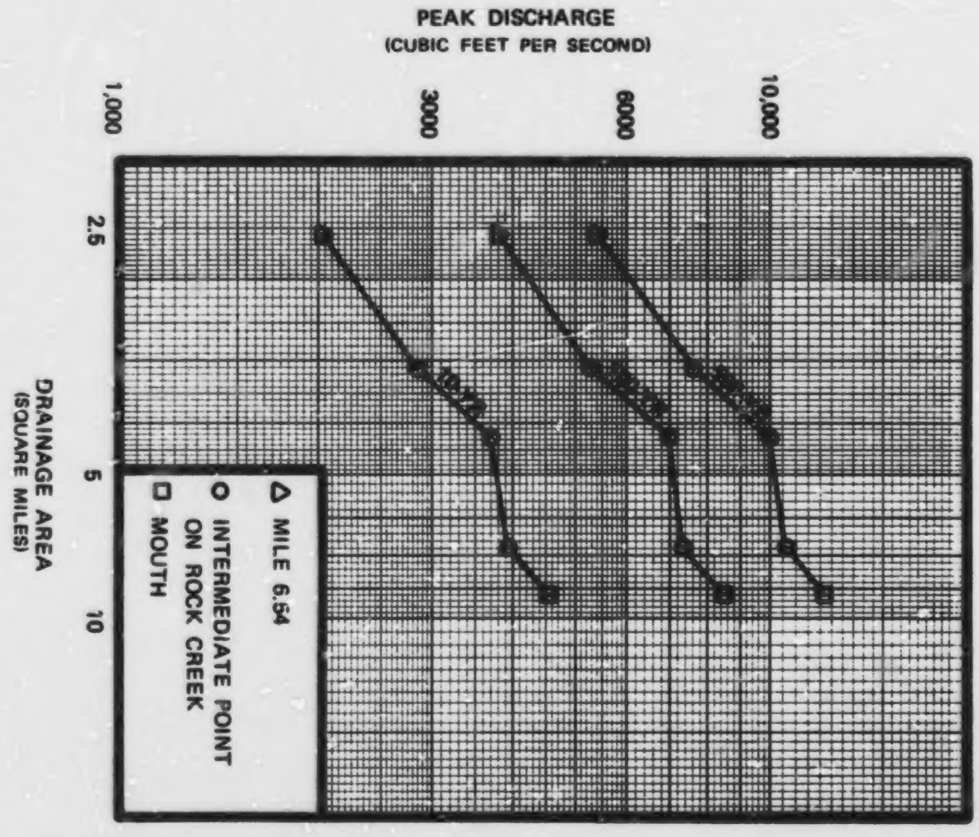
FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF INDEPENDENCE, MO

(CLAY AND JACKSON COS.)

FREQUENCY-DISCHARGE, DRAINAGE AREA CURVES

SUGAR CREEK



FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF INDEPENDENCE, MO
(CLAY AND JACKSON COS.)

FREQUENCY-DISCHARGE, DRAINAGE AREA CURVES

ROCK CREEK

FIGURE 2

8

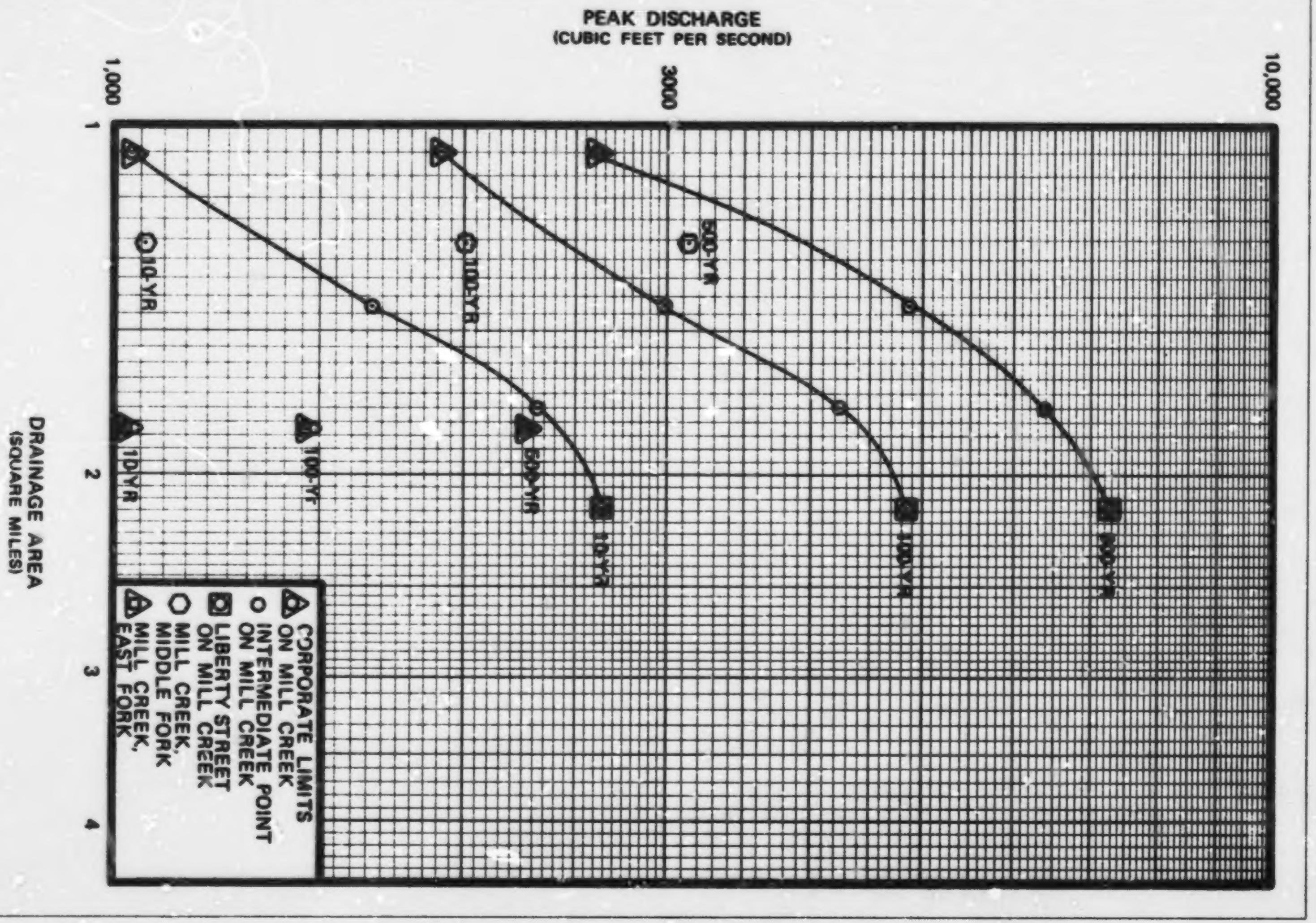


FIGURE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF INDEPENDENCE, MO
(CLAY AND JACKSON COS.)

FREQUENCY-DISCHARGE, DRAINAGE AREA CURVES

MILL CREEK, MILL CREEK EAST AND MIDDLE FORK

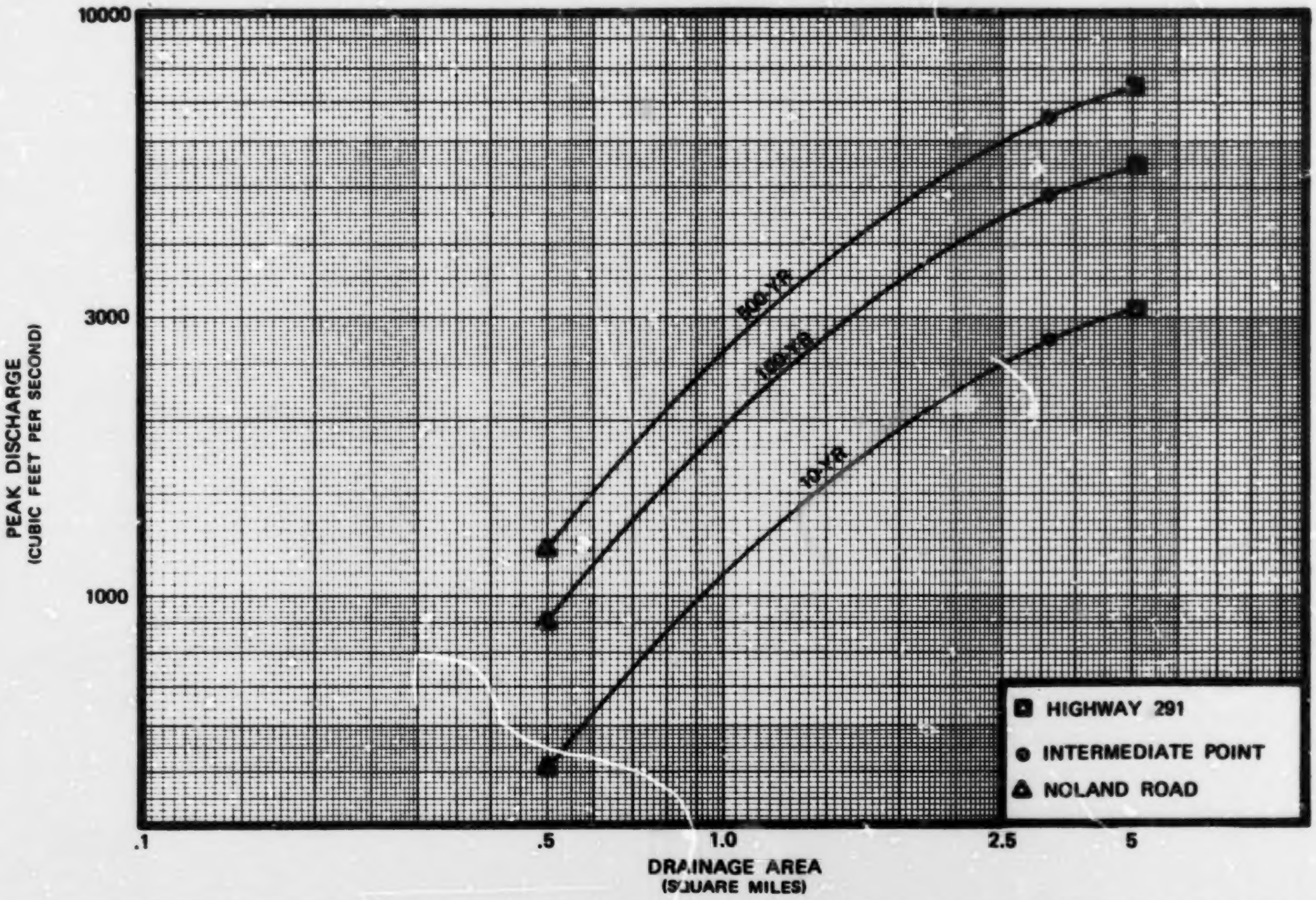


FIGURE 2

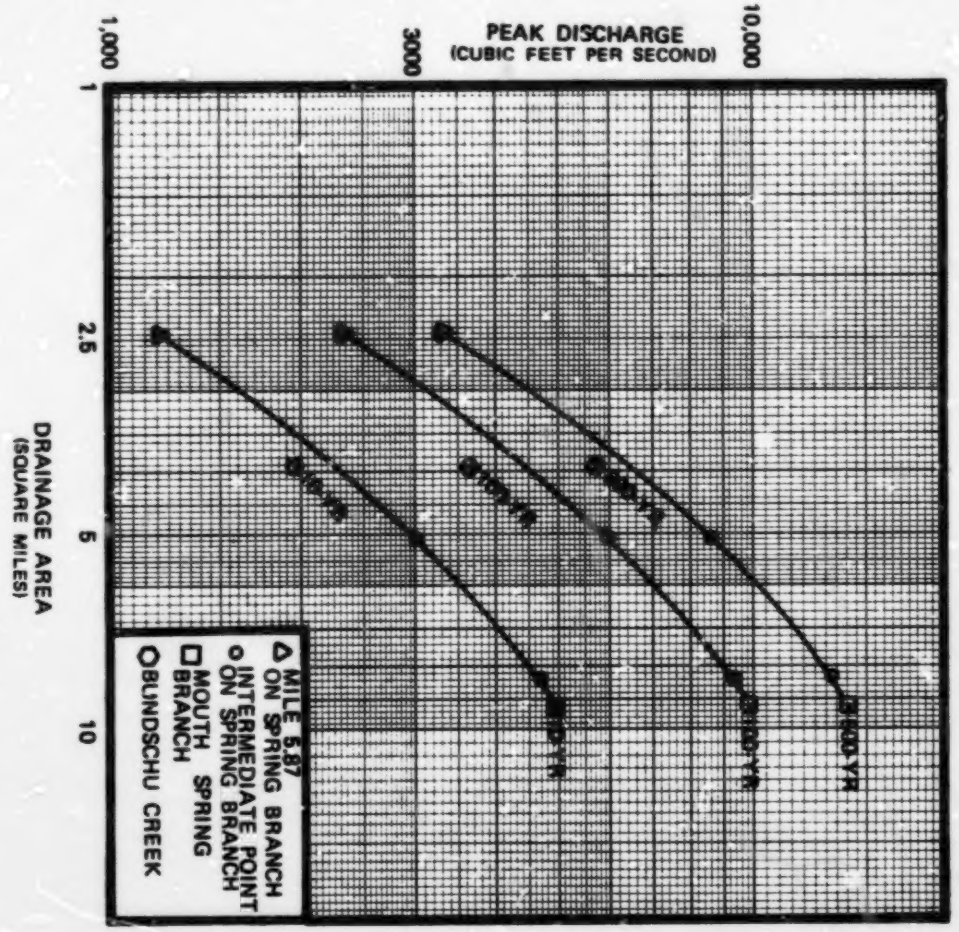
FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF INDEPENDENCE, MO

(CLAY AND JACKSON COS.)

FREQUENCY-DISCHARGE, DRAINAGE AREA CURVES

ADAIR CREEK



FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF INDEPENDENCE, MO
(CLAY AND JACKSON COS.)

FREQUENCY-DISCHARGE, DRAINAGE AREA CURVES

SPRING BRANCH, BUNDSCHU CREEK

FIGURE 2

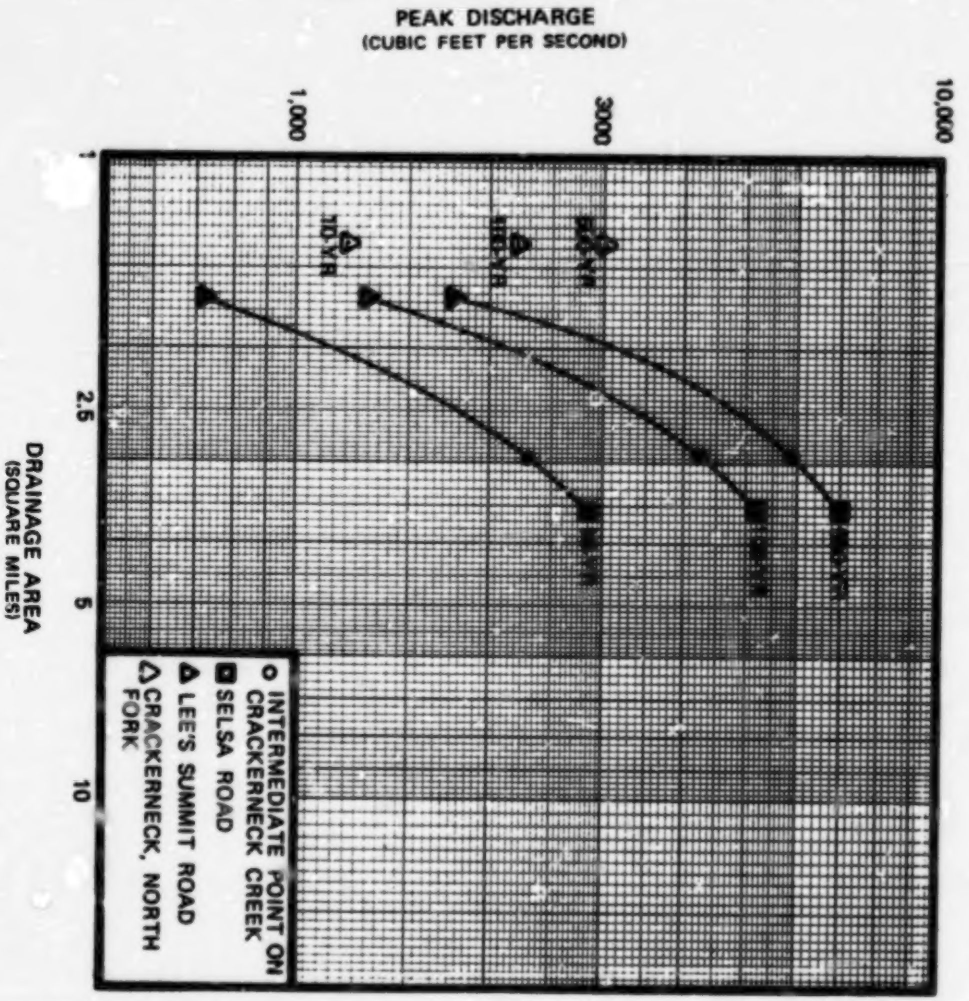


FIGURE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF INDEPENDENCE, MO
(CLAY AND JACKSON COS.)

FREQUENCY-DISCHARGE, DRAINAGE AREA CURVES

CRACKERNECK CREEK, CRACKERNECK CREEK NORTH FORK

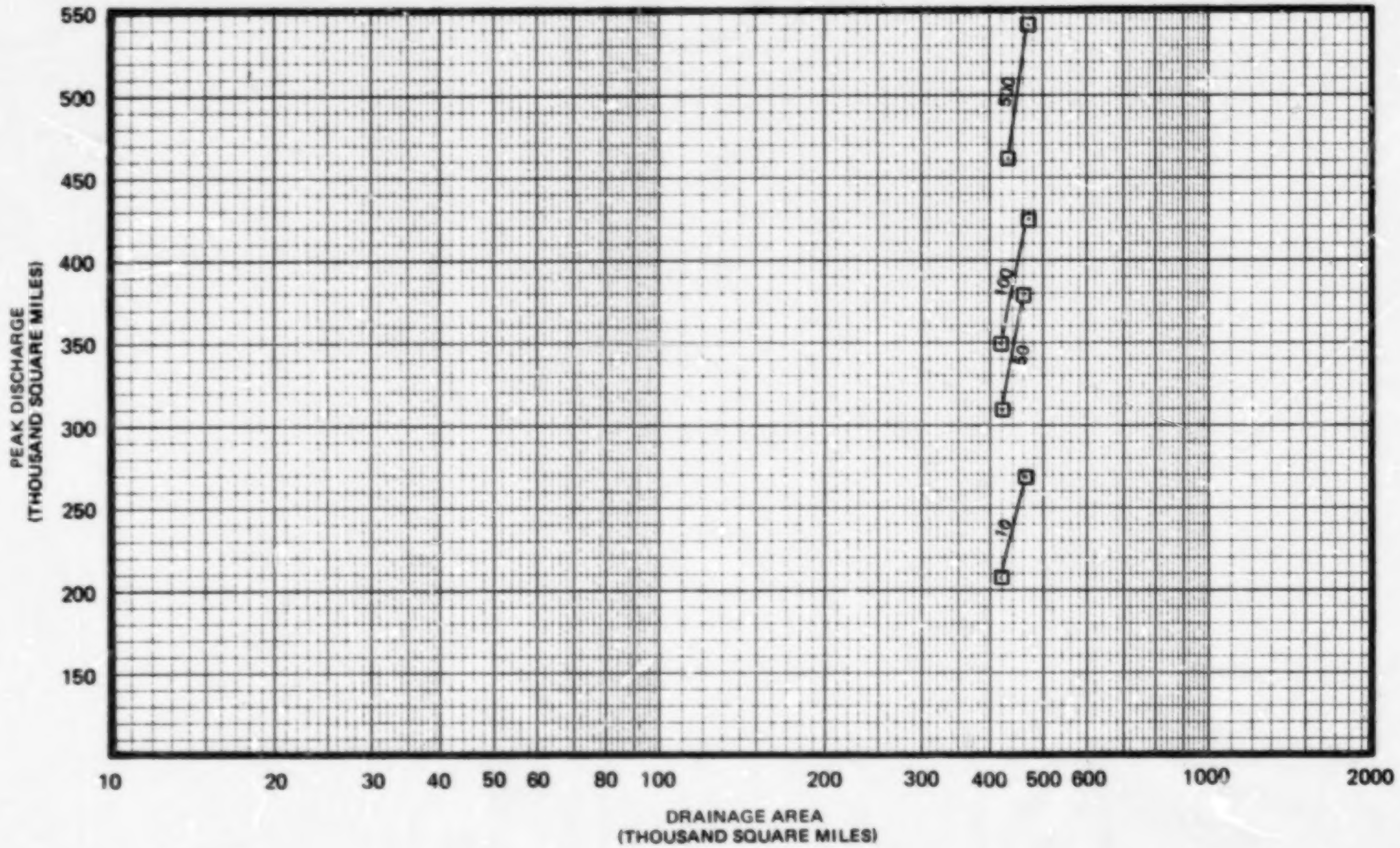


FIGURE 2

FEDERAL EMERGENCY MANAGMENT AGENCY

CITY OF INDEPENDENCE, MO

(CLAY AND JACKON COS.)

FREQUENCY-DISCHARGE, DRAINAGE AREA CURVES

MISSOURI RIVER

4.0 FLOOD PLAIN MANAGEMENT APPLICATIONS

A prime purpose of the National Flood Insurance Program is to encourage state and local governments to adopt sound flood plain management programs. Each Flood Insurance Study, therefore, includes a Flood Boundary and Floodway Map designed to assist communities in developing flood plain management measures that will provide the best use of their flood plain lands.

4.1 Flood Boundaries

In order to provide a national standard without regional discrimination, the 100-year flood has been adopted by the Federal Insurance Administration as the base flood for purposes of local land use and flood plain management. The 500-year flood is employed to indicate additional areas of flood risk in the community. For each stream studied in detail, the boundaries of the 100-year and the 500-year floods have been delineated using the flood elevations determined at each cross section; between cross sections, the boundaries were interpolated using topographic maps at a scale of 1:24,000 with a contour interval of 10 feet (Reference 3). In cases where the 100-year and the 500-year flood boundaries are close together, only the 100-year boundary has been shown.

For streams studied by approximate methods, the boundary of the 100-year flood was taken from USGS Flood-Prone Area Maps (Reference 4). For the Little Blue River, the boundary of the 100-year flood was taken from a Flood Plain Information Report that covers the Little Blue River (Reference 5) and a Flood Insurance Study that covers Kansas City (Reference 6).

Small areas within the flood boundaries may be above the flood elevations and, therefore, not be subject to flooding; owing to limitations of the map scale, such areas are not shown.

In some areas, zones of detailed study extend into zones determined by approximate methods in a finger-like manner. This approach was used to give a more detailed analysis of the zone studied by approximate methods.

4.2 Floodways

Encroachment on flood plains, such as artificial fill, reduces the flood-carrying capacity, increases the flood heights, thus increasing flood hazards in areas beyond the encroachment itself. One aspect of flood plain management involves balancing the economic gain from flood plain development against the resulting increase in flood hazard. For purposes of the Flood Insurance Program, the concept of a floodway is used as a tool to assist local communities in this aspect of flood plain management. Under this concept, the area of the 100-year flood is divided into a floodway and a floodway fringe. The floodway is the channel of a stream, plus any adjacent flood plain areas, that must be kept free of encroachment in order that the 100-year flood be carried without substantial increases in flood heights. Criteria adopted by the Federal Insurance Administration limit such increases in flood heights to 1.0 foot, provided that hazardous velocities are not produced. The floodways in this report are proposed to local agencies as minimum standards that can be adopted or that can be used as a basis for additional studies.

The floodways proposed for this Study were computed on the basis of equal conveyance reduction from each side of the flood plain. The results of these computations are tabulated at selected cross sections of each stream studied (Table 1). As shown on the Flood Boundary and Floodway Map, the floodway boundaries were determined at cross sections; between the cross sections, the boundaries were interpolated. Only certain reaches were adaptable to the encroachment concept. The steep gradients, meandering channels, and narrow flood plains made floodway determinations for some streams unpractical. For this reason, no floodway determinations were made for the flood plains of Little Blue River and Fire Prairie Creek.

The area between the floodway and the boundary of the 100-year flood is termed the floodway fringe. The floodway fringe thus encompasses the portion of the flood plain that could be completely obstructed without increasing the water-surface elevation of the 100-year flood more than 1.0 foot at any point. Typical relationships between the floodway and the floodway fringe and their significance to flood plain development are shown in Figure 3.

5.0 INSURANCE APPLICATION

In order to establish actuarial insurance rates, FIA has developed a process to transform the data from the engineering study into flood insurance criteria. This process includes the determination of reaches, Flood Hazard Factors, and flood insurance zone designations for each flooding source affecting the City of Independence, Missouri.

5.1 Reach Determinations

Reaches are defined as lengths of watercourses having relatively the same flood hazard, based on the average weighted difference in water-surface elevations between the 10- and 100-year floods. This difference does not have a variation greater than that indicated in the following table for more than 20 percent of the reach.

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY (FEET NGVD)	WITH FLOODWAY	INCREASE (FEET)
ROCK CREEK								
A	2.28	365	5856	1.5	752.7	752.7	753.7	1.0
B	2.50	500	5412	1.6	753.2	753.2	754.2	1.0
C	2.64	165	2127	4.0	753.2	753.2	754.2	1.0
D	2.77	280	3799	2.2	753.8	753.8	754.7	0.9
E	2.91	80	1082	7.9	756.3	756.3	756.3	0.0
F	3.20	322	3227	2.6	757.0	757.0	757.9	0.9
G	3.38	80	693	12.3	757.0	757.0	757.9	0.9
H	3.50	60	540	15.8	763.2	763.2	763.2	0.0
I	3.75	235	2824	3.0	776.4	776.4	777.4	1.0
J	3.86	235	2237	3.8	776.9	776.9	777.9	1.0
K	3.92	400	6448	1.2	783.1	783.1	784.1	1.0
L	4.25	210	2430	3.0	783.7	783.7	784.6	0.9
M	4.50	85	631	11.7	784.1	784.1	784.9	0.8
N	4.80	190	1228	6.0	799.6	799.6	800.3	0.7
O	4.99	210	1656	4.5	807.1	807.1	808.1	1.0
P	5.20	140	1018	7.3	815.7	815.7	816.7	1.0
Q	5.44	285	1485	5.0	823.2	823.2	824.2	1.0
R	5.56	215	1832	4.0	829.6	829.6	830.5	0.9
S	5.96	205	1691	4.1	843.8	843.8	844.8	1.0
T	6.00	170	1123	6.2	844.9	844.9	845.7	0.8
U	6.26	110	1091	4.9	856.5	856.5	857.5	1.0
V	6.42	160	1022	5.2	857.6	857.6	858.3	0.7
W	6.68	90	780	4.9	866.9	866.9	867.5	0.6
X	6.89	160	766	5.0	874.5	874.5	875.5	1.0
Y	7.20	180	750	5.1	887.4	887.4	888.4	1.0
Z	7.36	120	501	7.6	893.2	893.2	894.2	1.0
AA	7.51	153	736	5.2	900.0	900.0	901.0	1.0

[1] Miles Above Mouth

REVISED: AUGUST 18, 1981

TABLE 1	FEDERAL EMERGENCY MANAGEMENT AGENCY **CITY OF INDEPENDENCE, MO** **(CLAY AND JACKSON COS.)**	**FLOODWAY DATA** **ROCK CREEK**

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY (FEET NGVD)	WITH FLOODWAY	INCREASE (FEET)
MILL CREEK (Continued)								
F	7.12	60	414	7.2	895.6	895.6	896.3	0.7
G	7.93	75	663	2.9	941.7	941.7	942.7	1.0
H	8.09	60	249	7.6	942.7	942.7	943.4	0.7
ADAIR CREEK								
A	0.66	250	4715	1.2	778.2	778.2	779.1	0.9
B	0.77	325	5206	1.1	778.3	778.3	779.3	1.0
C	0.82	350	6039	0.9	778.5	778.5	779.4	0.9
D	1.20	120	1778	3.0	778.7	778.7	779.6	0.9
E	1.68	70	448	12.2	783.5	783.5	784.0	0.5
F	2.06	100	680	8.0	796.3	796.3	796.6	0.3
G	2.45	113	836	5.8	809.8	809.8	809.8	0.0
H	2.84	50	451	10.8	815.9	815.9	816.6	0.7
I	3.31	130	854	5.7	844.8	844.8	845.4	0.6
J	3.36	220	1053	4.6	847.7	847.7	847.8	0.1
K	3.75	23	89	10.1	873.9	873.9	874.4	0.5
L	4.42	150	568	1.6	910.6	910.6	911.0	0.4
CRACKERNECK CREEK								
A	1.08	140	1382	3.8	764.7	764.7	765.7	1.0
B	1.29	75	827	6.4	765.7	765.7	766.6	0.9
C	1.44	225	1873	2.8	767.2	767.2	768.1	0.9
D	3.80	175	1064	4.0	824.4	824.4	825.4	1.0
E	4.00	70	332	12.9	833.7	833.7	833.8	0.1
F	4.28	110	799	3.8	849.3	849.3	849.4	0.1

[1] Miles Above Mouth

REVISED: AUGUST 18, 1981

TABLE 1

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF INDEPENDENCE, MO
(CLAY AND JACKSON COS.)

FLOODWAY DATA

MILL CREEK, ADAIR CREEK AND CRACKERNECK CREEK

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FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY (FEET NGVD)	WITH FLOODWAY	INCREASE (FEET)
SUGAR CREEK								
A	2.04	182	1413	1.9	819.3	819.3	820.3	1.0
B	2.19	185	848	3.2	819.6	819.6	820.6	1.0
C	2.23	173	3389	0.8	825.5	825.5	826.5	1.0
D	2.33	200	2679	1.0	825.5	825.5	826.5	1.0
E	2.38	216	4713	0.6	834.8	834.8	835.8	1.0
F	2.70	116	1826	1.5	843.1	843.1	844.0	0.9
G	2.76	220	2217	1.2	843.4	843.4	844.3	0.9
H	2.96	210	359	5.3	852.0	852.0	852.2	0.2
I	3.03	22	172	11.1	862.2	862.2	862.2	0.0
J	3.05	50	607	3.2	867.8	867.8	868.8	1.0
K	3.21	25	154	12.4	869.9	869.9	870.4	0.5
L	3.23	31	341	5.6	876.7	876.7	877.7	1.0
M	3.44	39	302	6.3	893.4	893.4	894.4	1.0
N	3.60	148	2296	0.8	915.8	915.8	916.7	0.9
O	3.65	40	546	3.5	915.8	915.8	916.8	1.0
SUGAR CREEK NORTH FORK								
A	0.06	14	65	12.2	843.4	843.4	843.5	0.1
MILL CREEK								
A	5.13	141	539	8.9	818.5	818.5	819.5	1.0
B	5.26	286	733	5.8	827.6	827.6	828.0	0.4
C	5.64	125	765	5.5	839.1	839.1	839.9	0.8
D	6.06	80	554	5.4	851.8	851.8	852.3	0.5
E	6.90	115	949	3.2	894.3	894.3	895.3	1.0

[1] Miles Above Mouth

REVISED: AUGUST 18, 1981

TABLE 1

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF INDEPENDENCE, MO
(CLAY AND JACKSON COS.)

FLOODWAY DATA

SUGAR CREEK, SUGAR CREEK NORTH FORK AND MILL CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY (FEET NGVD)	WITH FLOODWAY	INCREASE (FEET)
BUNDSCHU CREEK								
A	1.14	110.00	738	5.0	751.4	751.4	751.4	0.0
B	1.41	150.00	776	4.7	754.8	754.8	755.1	0.3
C	1.59	35.00	370	9.9	757.0	757.0	757.3	0.3
D	2.25	50.47	307	1.2	765.7	765.7	765.7	0.0
MISSOURI RIVER								
A	357.38	4,573.2[2]	55,556	7.7	739.5	739.5	740.0	0.5
B	357.74	4,479.2[2]	43,665	9.7	739.8	739.8	740.0	0.2

REVISED: AUGUST 18, 1981

[1] Miles Above Mouth

[2] This Width Entirely Outside Corporate Limits

TABLE 1

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF INDEPENDENCE, MO
(CLAY AND JACKSON COS.)

FLOODWAY DATA

BUNDSCHU CREEK AND MISSOURI RIVER

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FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY (FEET NGVD)	WITH FLOODWAY	INCREASE (FEET)
CRACKERNECK CREEK NORTH FORK								
A	0.30	90	894	2.5	759.7	759.7	760.7	1.0
B	0.51	77	440	5.0	759.8	759.8	760.8	1.0
C	0.54	104	768	2.9	763.7	763.7	763.9	0.2
D	0.77	78	512	4.3	764.6	764.6	764.9	0.3
SPRING BRANCH								
A	2.21	700	5444	1.8	764.1	764.1	764.6	0.5
B	2.45	475	3107	3.2	764.5	764.5	765.1	0.6
C	2.73	540	3207	3.1	765.8	765.8	766.5	0.7
D	2.78	750	7152	1.4	771.2	771.2	771.9	0.7
E	3.00	430	1790	5.5	771.2	771.2	771.9	0.7
F	3.25	600	3831	2.6	774.0	774.0	774.7	0.7
G	3.53	130	1178	8.3	775.1	775.1	776.1	1.0
H	5.56	177	1343	1.7	810.5	810.5	810.7	0.2
I	5.59	225	2136	1.1	812.1	812.1	813.0	0.9
J	5.78	110	728	3.2	812.7	812.7	813.4	0.7
SPRING BRANCH NORTH FORK								
A	0.16	186	1600	2.3	773.7	773.7	774.7	1.0
B	0.20	109	1015	3.6	773.7	773.7	774.7	1.0
C	0.37	69	703	5.2	774.6	774.6	775.4	0.8
D	0.52	40	422	8.6	775.6	775.6	776.4	0.8

---

[1] Miles Above Mouth

REVISED: AUGUST 18, 1981

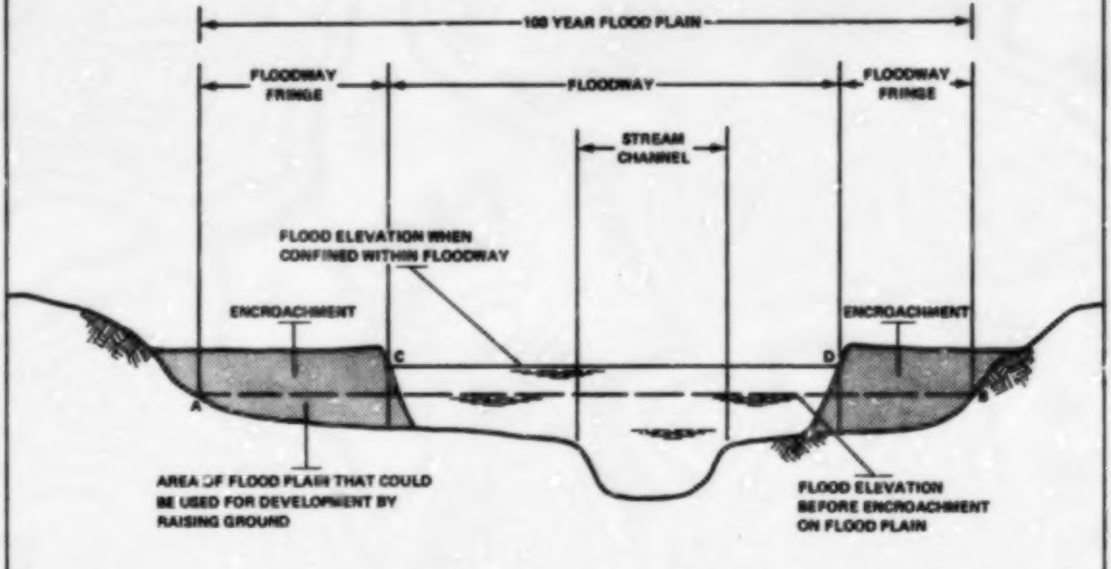
TABLE 1

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF INDEPENDENCE, MO
(CLAY AND JACKSON COS.)

FLOODWAY DATA

CRACKERNECK CREEK NORTH FORK, SPRING BRANCH AND SPRING BRANCH NORTH FORK


100 YEAR FLOOD PLAIN
FLOODWAY FRINGE
FLOODWAY
FLOODWAY FRINGE
STREAM CHANNEL
FLOOD ELEVATION WHEN CONFINED WITHIN FLOODWAY
ENCROACHMENT
ENCROACHMENT
A
C
D
B
AREA OF FLOOD PLAIN THAT COULD BE USED FOR DEVELOPMENT BY RAISING GROUND
FLOOD ELEVATION BEFORE ENCROACHMENT ON FLOOD PLAIN

LINE A - B IS THE FLOOD ELEVATION BEFORE ENCROACHMENT
LINE C - D IS THE FLOOD ELEVATION AFTER ENCROACHMENT

FLOODWAY SCHEMATIC

Figure 3

Average Difference Between 10- and 100-Year Floods	Variation
Less than 2 feet	0.5 foot
2 to 7 feet	1.0 foot

Twenty-two reaches meeting the above criteria were required for the flooding sources studied in detail in the City of Independence. These included three on Rock Creek between River Miles 2.3 and 7.51, one on Sugar Creek between River Miles 2.04 and 3.7, one on Sugar Creek North Fork between River Miles 0 and 0.45, one on Mill Creek between River Miles 4.92 and 8.15, one on Mill Creek Middle Fork between River Miles 0.0 and 1.71, one on Mill Creek East Fork between River Miles 0.0 and 1.70, four on Adair Creek between River Miles 0.63 and 4.88, two on Crackerneck Creek between River Miles 1.05 and 5.56, one on Crackerneck Creek North Fork between River Miles 0.28 and 2.45, one on Spring Branch between River Miles 2.15 and 6.80, two on Spring Branch North Fork between River Miles 0.15 and 2.55, two on Spring Branch South Fork between River Miles 5.77 and 6.3, one on Bundschu Creek between River Miles 1.12 and 2.30, and one on the

Missouri River between River Miles 357.1 and 357.9. The locations of the reaches are shown on the Flood Profiles.

5.2 Flood Hazard Factors

The Flood Hazard Factor (FHF) is the Federal Insurance Administration device used to correlate flood information with insurance rate tables. Correlations between property damage from floods and their FHF are used to set actuarial insurance premium rate tables based on FHFs from 005 to 200.

The FHF for a reach is the average weighted difference between the 10- and 100-year flood water-surface elevations expressed to the nearest one-half foot, and shown as a three-digit code. For example, if the difference between water-surface elevations of the 10- and 100-year floods is 0.7 foot, the FHF is 005; if the difference is 1.4 feet, the FHF is 015; if the difference is 5.0 feet, the FHF is 050. When the difference between the 10- and 100-year water-surface elevations is greater than 10.0 feet, accuracy for the FHF is to the nearest foot.

5.3 Flood Insurance Zones

After the determination of reaches and their respective Flood Hazard Factors, the entire incorporated area of the City of Independence was divided into zones, each having a specific flood potential or hazard. Each zone was assigned one of the following flood insurance zone designations:

Zone A:	Special Flood Hazard Areas inundated by the 100-year flood determined by approximate methods; no base flood elevations or Flood Hazard Factors determined.
Zone A1, A2, A3, A4, A5, A6, A7, A10, A13, and A14:	Special Flood Hazard Areas inundated by the 100-year flood, determined by detailed methods; base flood elevations shown, and zones subdivided according to Flood Hazard Factors.
Zone B:	Area between the Special Flood Hazard Area and the limits of the 500-year flood, including areas of the 500-year flood plain that are protected from the 100-year flood by dike, levee, or other water-control structure; or, areas subject to certain types of 100-year shallow flooding where depths are less than 1.0 foot. Zone B is not subdivided.

Zone C: Areas of minimal flooding.

Table 2, "Flood Insurance Zone Data," summarizes the flood elevation differences, Flood Hazard Factors, flood insurance zones, and base flood elevations for each flooding source studied in detail in the community.

5.4 Flood Insurance Rate Map Description

The Flood Insurance Rate Map for the City of Independence is, for insurance purposes, the net result of the Flood Insurance Study. It is the official map on which the Federal Insurance Administration has delineated the flood insurance zones and base flood elevation lines. Base flood elevation lines show the expected whole-foot water-surface elevations of the base (100-year) flood and the location at which that elevation would occur.

These maps are developed in accordance with the latest flood insurance map preparation guidelines published by FIA.

6.0 OTHER STUDIES

A Flood Plain Information Report which included Rock Creek was prepared by the U.S. Army Corps of Engineers in 1972 (Reference 7). In this report, the profiles within the City of Independence are one foot higher than base flood elevations used in the present study. Discussions with the Corps of Engineers verified that the Flood Plain Information Report used rainfall recording stations at Kansas City Municipal Airport and Unity Village.

There were no official rainfall records available at the City of Independence. This report used Generalized Flood-Frequency Estimates for Urban Areas in Missouri (Reference 1). Since profiles in the present study reflect urbanization in the area, they supersede those in the earlier report. This was also found true in comparing another Flood Plain Information Report that studied Spring Branch in 1973 (Reference 8). Thus, this report does not disagree with any previously published reports and is authoritative for purposes of the Flood Insurance Program.

7.0 LOCATION OF DATA

All hydrologic, hydraulic, and survey data prepared for this study, including preliminary floodway computations, are being retained for possible future reference or usage for a period of five years by the Kansas City District U.S. Army Corps of Engineers, Kansas City, Missouri.

FLOODING SOURCE	PANEL[1]	ELEVATION DIFFERENCE[2] BETWEEN 1.0% (100-YEAR) FLOOD AND 10% (10-YEAR)	2% (50-YEAR)	0.2% (500-YEAR)	FLOOD HAZARD FACTOR	ZONE	BASE FLOOD ELEVATION[3] (FEET NGVD)
ROCK CREEK							
Reach 1	0005	-5.0	--	+4.3	050	A10	Varies - See Map
Reach 2	0005,0020	-2.8	--	+2.5	030	A6	Varies - See Map
Reach 3	0020	-2.0	--	+1.5	020	A4	Varies - See Map
SUGAR CREEK							
Reach 1	0005,0020	-1.3	--	+1.1	015	A3	Varies - See Map
SUGAR CREEK NORTH FORK							
Reach 1	0020	-3.0	--	+1.1	030	A6	Varies - See Map
MILL CREEK							
Reach 1	0005	-1.7	--	+1.4	015	A3	Varies - See Map
MILL CREEK MIDDLE FORK							
Reach 1	0005	-1.0	--	+0.8	010	A2	Varies - See Map
MILL CREEK EAST FORK							
Reach 1	0005	-1.2	--	+0.8	010	A2	Varies - See Map

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[1] FLOOD INSURANCE RATE MAP PANEL

[2] WEIGHTED AVERAGE

[3] ROUNDED TO NEAREST FOOT

REVISED: AUGUST 18, 1981

TABLE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF INDEPENDENCE, MO
(CLAY AND JACKSON COS.)

FLOOD INSURANCE ZONE DATA

ROCK CREEK, SUGAR CREEK, SUGAR CREEK NORTH FORK, MILL CREEK, MILL CREEK MIDDLE FORK AND MILL CREEK EAST FORK

FLOODING SOURCE	PANEL [1]	ELEVATION DIFFERENCE [2] BETWEEN 1.0% (100-YEAR) FLOOD AND 10% (10-YEAR)	2% (50-YEAR)	0.2% (500-YEAR)	FLOOD HAZARD FACTOR	ZONE	BASE FLOOD ELEVATION [3] (FEET NGVD)
ADAIR CREEK							
Reach 1	0040	-6.9	--	+8.5	070	A14	Varies - See Map
Reach 2	0035,0040	-2.4	--	+3.3	025	A5	Varies - See Map
Reach 3	0035	-1.1	--	+1.1	010	A2	Varies - See Map
Reach 4	0035	-3.5	--	+1.0	035	A7	Varies - See Map
CRACKERNECK CREEK							
Reach 1	0020,0025	-2.7	--	+2.0	025	A5	Varies - See Map
Reach 2	0020	-1.2	--	+0.8	010	A2	Varies - See Map
CRACKERNECK CREEK NORTH FORK							
Reach 1	0025	-2.3	--	+1.8	025	A5	Varies - See Map
SPRING BRANCH							
Reach 1	0020,0025	-2.7	--	+1.7	025	A5	Varies - See Map
SPRING BRANCH NORTH FORK							
Reach 1	0010,0025	-2.0	--	+1.5	020	A4	Varies - See Map
Reach 2	0010	-0.4	--	+0.4	005	A1	Varies - See Map

[1] FLOOD INSURANCE RATE MAP PANEL

[2] WEIGHTED AVERAGE

[3] ROUNDED TO NEAREST FOOT

REVISED: AUGUST 18, 1981

TABLE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF INDEPENDENCE, MO
(CLAY AND JACKSON COS.)

FLOOD INSURANCE ZONE DATA

ADAIR CREEK, CRACKERNECK CREEK, CRACKERNECK CREEK NORTH FORK, SPRING BRANCH AND SPRING BRANCH NORTH FORK

25

FLOODING SOURCE	PANEL[1]	ELEVATION DIFFERENCE[2] BETWEEN 1.0% (100-YEAR) FLOOD AND			FLOOD HAZARD FACTOR	ZONE	BASE FLOOD ELEVATION (FEET NGVD)[3]
		10% (10-YEAR)	2% (50-YEAR)	0.2% (500-YEAR)			
SPRING BRANCH SOUTH FORK							
Raach 1	0025	-6.3	--	+2.8	065	A13	Varies - See Map
Reach 2	0020, 0025	-2.2	--	+1.2	020	A4	Varies - See Map
BUNDSCHU CREEK							
Reach 1	0010	-2.6	--	+1.8	025	A5	Varies - See Map
MISSOURI RIVER							
Reach 1	0005	-6.3	--	+4.0	065	A13	Varies - See Map

[1] FLOOD INSURANCE RATE MAP PANEL [2] WEIGHTED AVERAGE [3] ROUNDED TO NEAREST FOOT

REVISED: AUGUST 18, 1981

TABLE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF INDEPENDENCE, MO
(CLAY AND JACKSON COS.)

FLOOD INSURANCE ZONE DATA

SPRING BRANCH SOUTH FORK, BUNDSCHU CREEK AND MISSIOURI RIVER

8.0 BIBLIOGRAPHY AND REFERENCES

1. Gann, E. E., Generalized Flood-Frequency Estimates for Urban Areas in Missouri, United States Department of the Interior, Geological Survey, Water Resources Division, Rolla, Missouri.

2. U.S. Army Corps of Engineers, HEC-2 Computer Program, Water-Surface Profiles.

3. U.S. Department of the Interior, Geological Survey Quadrangle Map, 7.5-Minute Series, entitled: Blue Springs, Missouri, 1965, photorevised 1970; Buckner, Missouri, 1965; Independence, Missouri, 1965, photorevised 1970; Liberty, Missouri, 1965, photorevised 1970; Missouri City, Missouri, 1965, photorevised 1970; and Oak Grove, Missouri, 1965.

4. U.S. Geological Survey Flood-Prone Area Maps, 7.5-Minute Series, entitled: Buckner, Missouri, 1965; Missouri City, Missouri, 1965; and Oak Grove, Missouri, 1965.

5. U.S. Army Corps of Engineers, Flood Plain Information Report: Little Blue River, East Fork, White Oak Branch, Jackson County, Missouri, Kansas City District, Flood Plain Management Services Branch, May, 1970.

6. U.S. Army Corps of Engineers, Flood Insurance Study: Kansas City, Missouri, Kansas City District, December, 1973.

7. U.S. Army Corps of Engineers, Flood Plain Information Report: Rock Creek, Independence, Missouri, Kansas City District, Flood Plain Management Services Branch, February, 1973.

8. U.S. Army Corps of Engineers, Flood Plain Information Report: Spring Branch, Independence, Missouri, Kansas City District, Flood Plain Management Services Branch, February, 1973.

9.0 REVISIONS DESCRIPTION (Revised June 18, 1987)

9.1 Purpose

The purpose of this Flood Insurance Study Revisions Description is to incorporate revised data into this currently effective Flood Insurance Study for the City of Independence, Jackson and Clay Counties, Missouri. This Revisions Description is intended to provide updated information that aids in the administration of the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973.

9.2 Acknowledgments

The hydrologic and hydraulic analyses for this Revisions Description were performed by the U.S. Army Corps of Engineers, Kansas City District. The Federal Emergency Management Agency (FEMA) reviewed and accepted these data for purposes of this revision.

9.3 Scope

This Flood Insurance Study was revised to reorient the base flood elevations for the Missouri River that were incorrectly delineated on the currently effective Flood Insurance Rate Map (Reference 1). The base flood elevations had incorrectly depicted the flow direction for the Missouri River. The base flood elevations have been corrected on the revised Flood Insurance Rate Map to show the proper flow direction and to match the Flood Insurance Study for the contiguous communities of the City of Kansas City, Missouri, and the City of Sugar Creek, Missouri (References 2 and 3). No new hydrologic or hydraulic analyses were performed for this revision.

9.4 Other Studies

This Flood Insurance Study has been revised to match the Flood Insurance Studies for the contiguous communities of Kansas City and Sugar Creek (References 2 and 3). All studies are now in agreement.

9.5 Location of Data

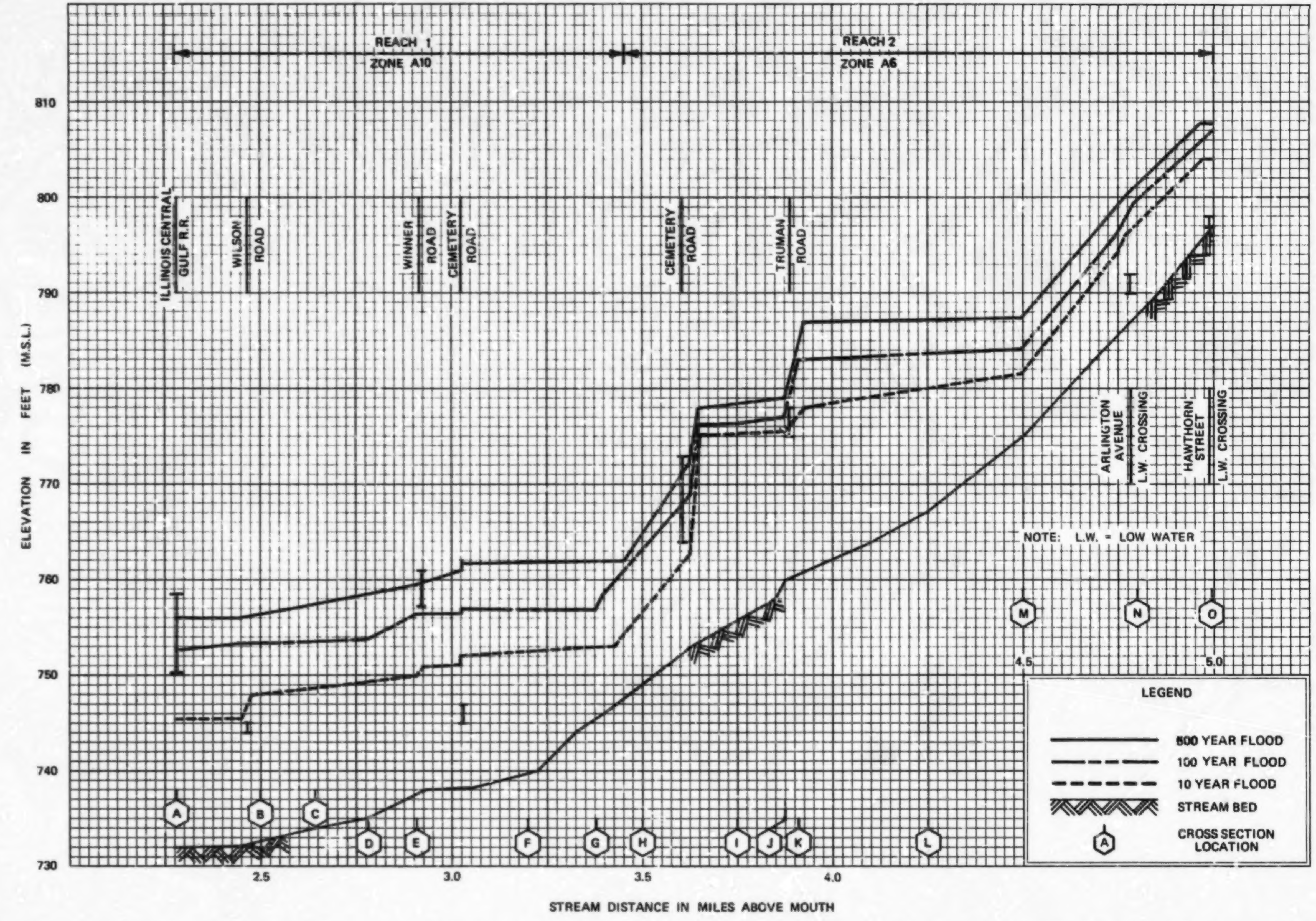
Information concerning the pertinent data used in the preparation of this study can be obtained by contacting the Natural and Technological Hazards Division, FEMA, Old Federal Office Building, Room 300, 911 Walnut Street, Kansas City, Missouri 64106.

9.6 Bibliography and References

1. Federal Emergency Management Agency, Flood Insurance Study, City of Independence, Clay and Jackson Counties, Missouri, August 1981.

2. ----------, Flood Insurance Study, City of Kansas City, Clay, Platte, and Jackson Counties, Missouri, August 1986.

3. U.S. Department of Housing and Urban Development, Federal Insurance Administration, Flood Insurance Study, City of Sugar Creek, Jackson and Clay Counties, Missouri, January 1979.



FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF INDEPENDENCE, MO
(CLAY AND JACKSON COS.)

FLOOD PROFILES

ROCK CREEK

01P

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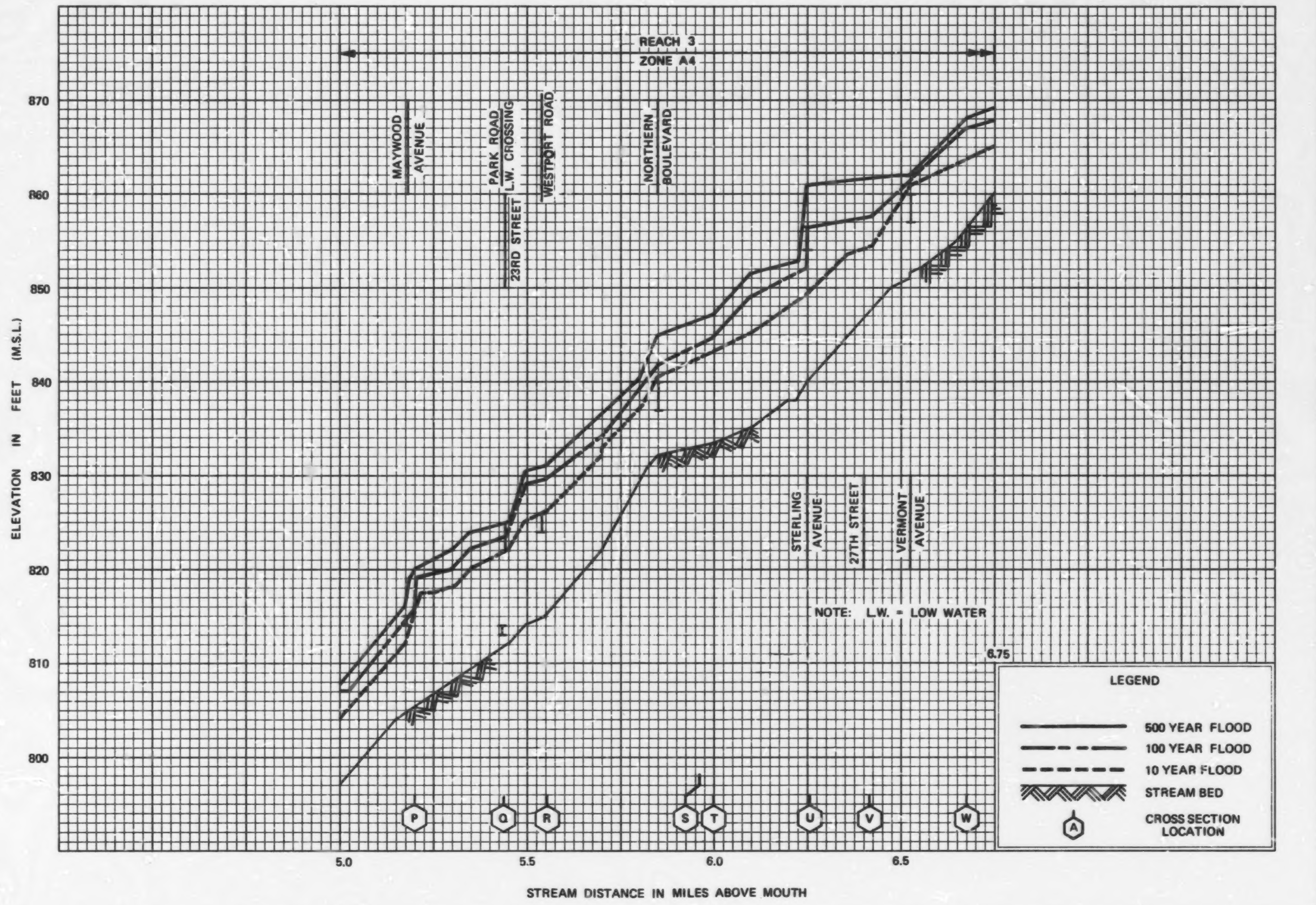

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF INDEPENDENCE, MO
(CLAY AND JACKSON COS.)

FLOOD PROFILES

ROCK CREEK

02P

31

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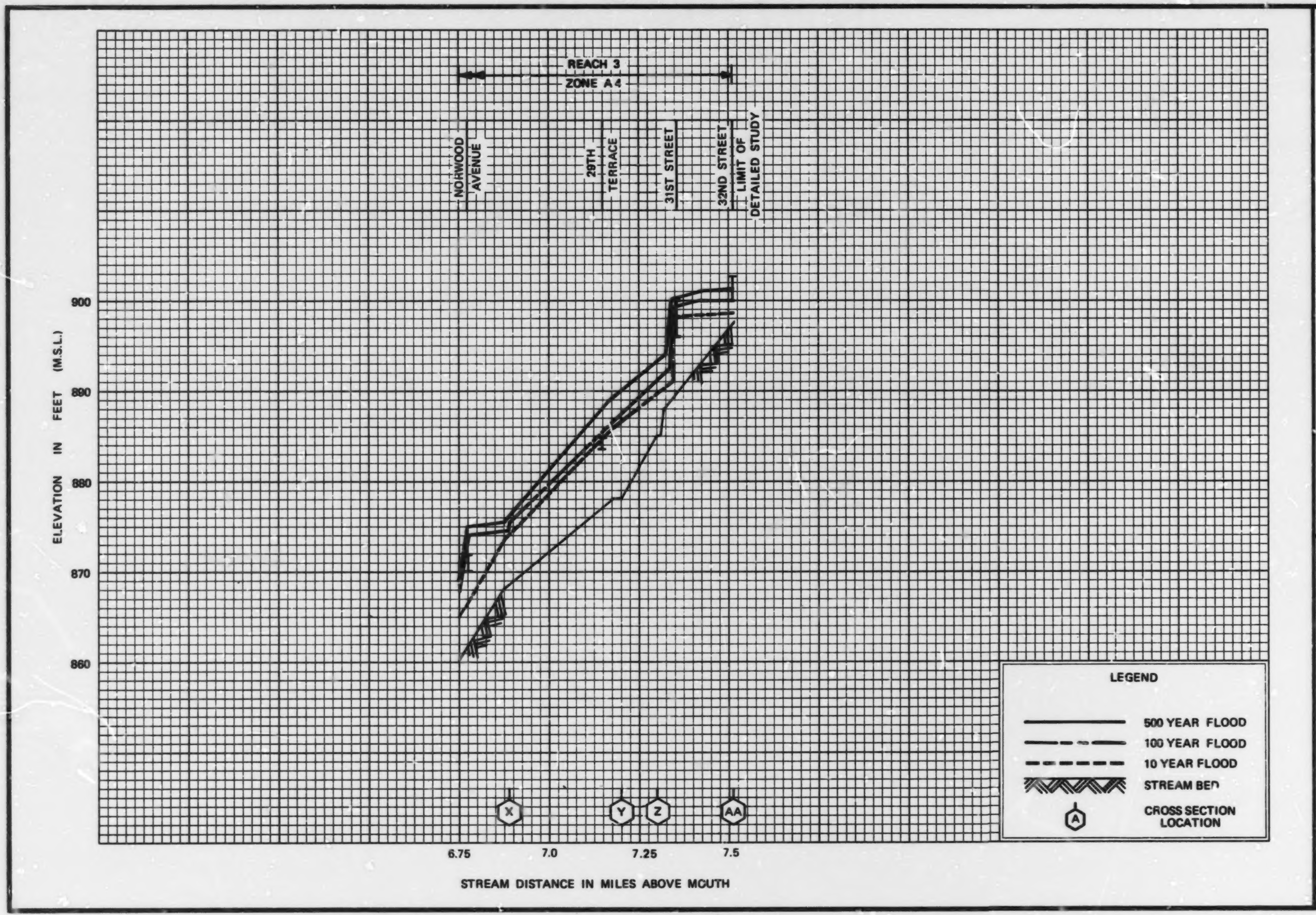


FLOOD PROFILES

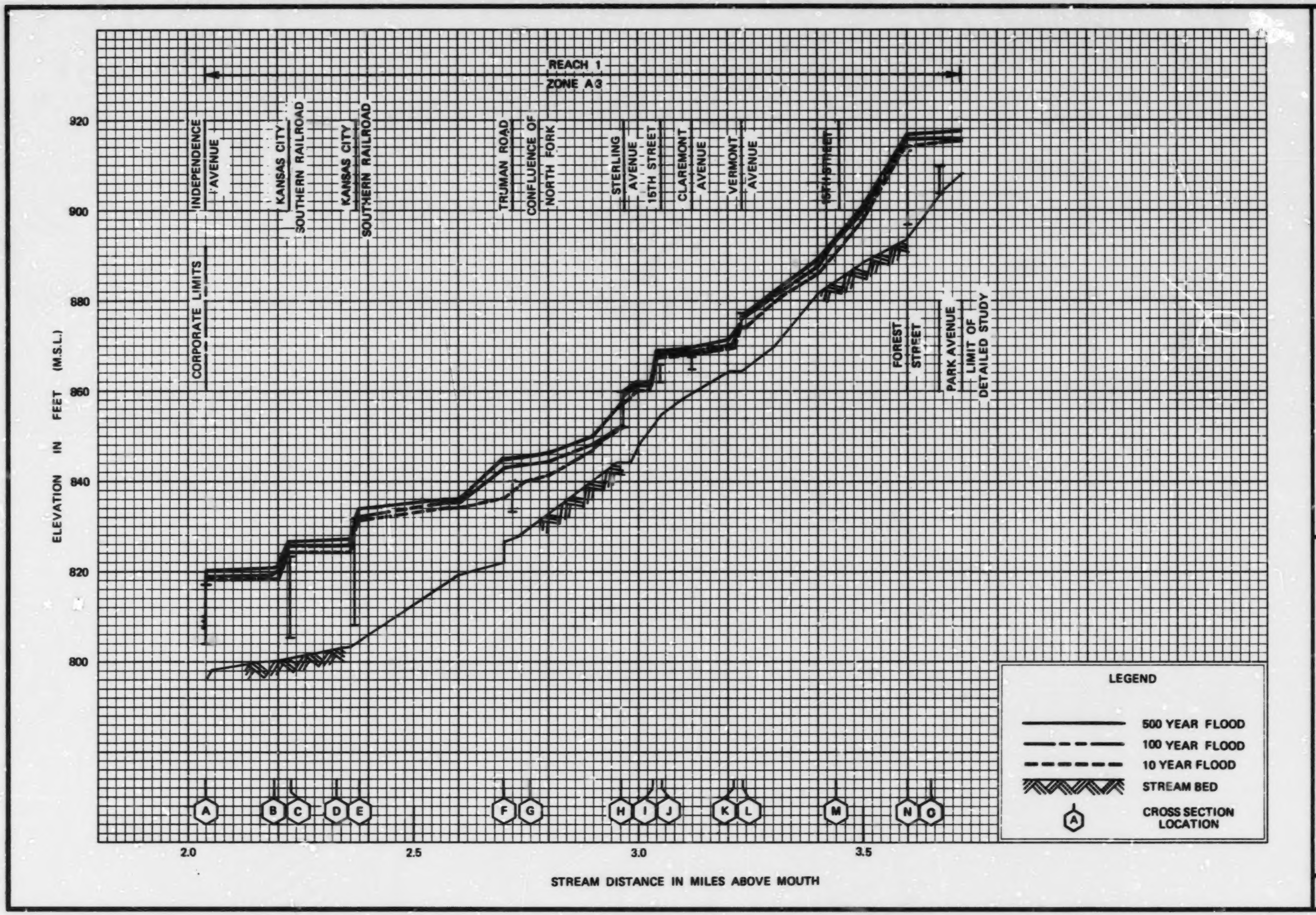
ROCK CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF INDEPENDENCE, MO

(CLAY AND JACKSON COS.)

03P



FLOOD PROFILES

SUGAR CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF INDEPENDENCE, MO
(CLAY AND JACKSON COS.)

04P

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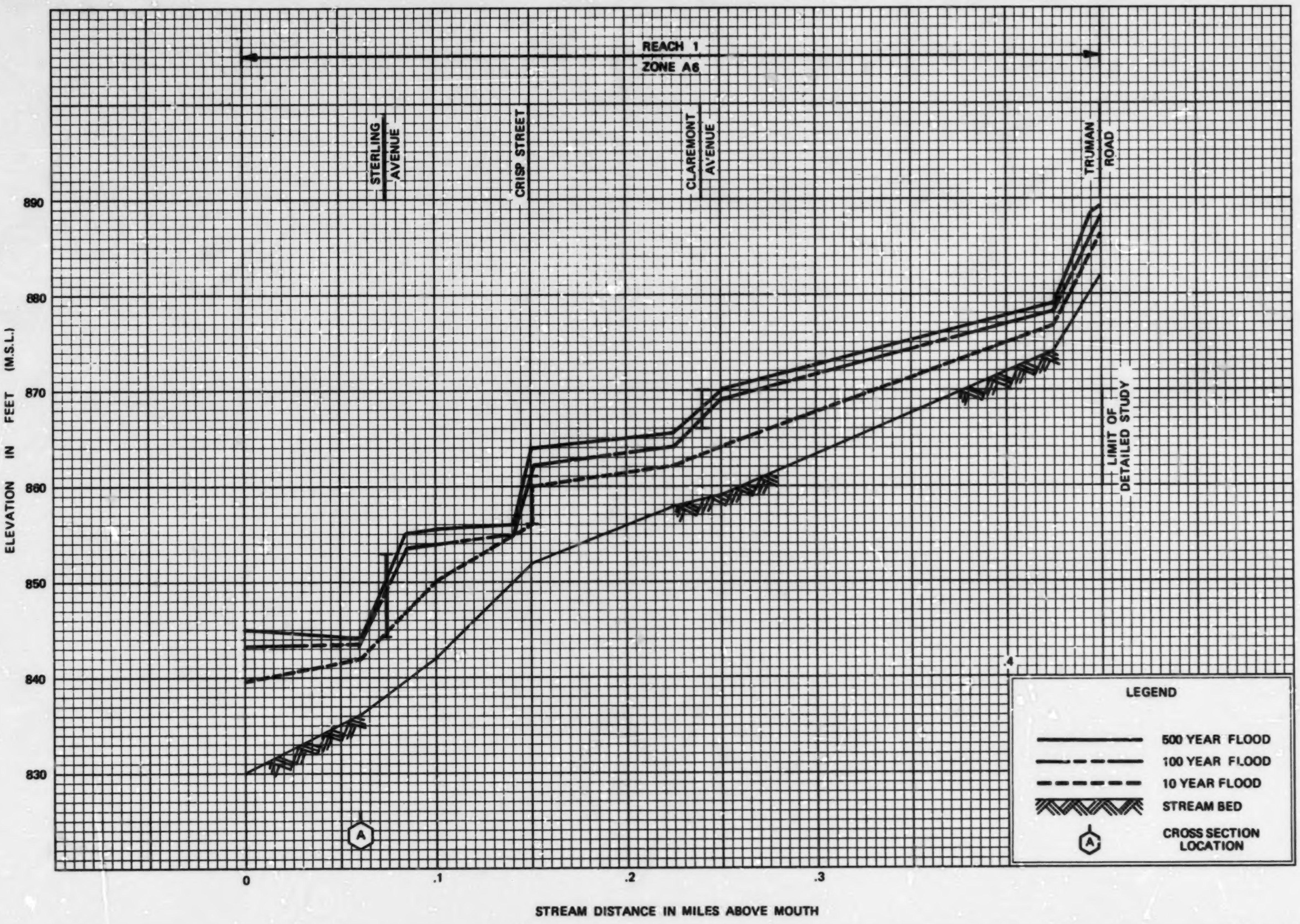


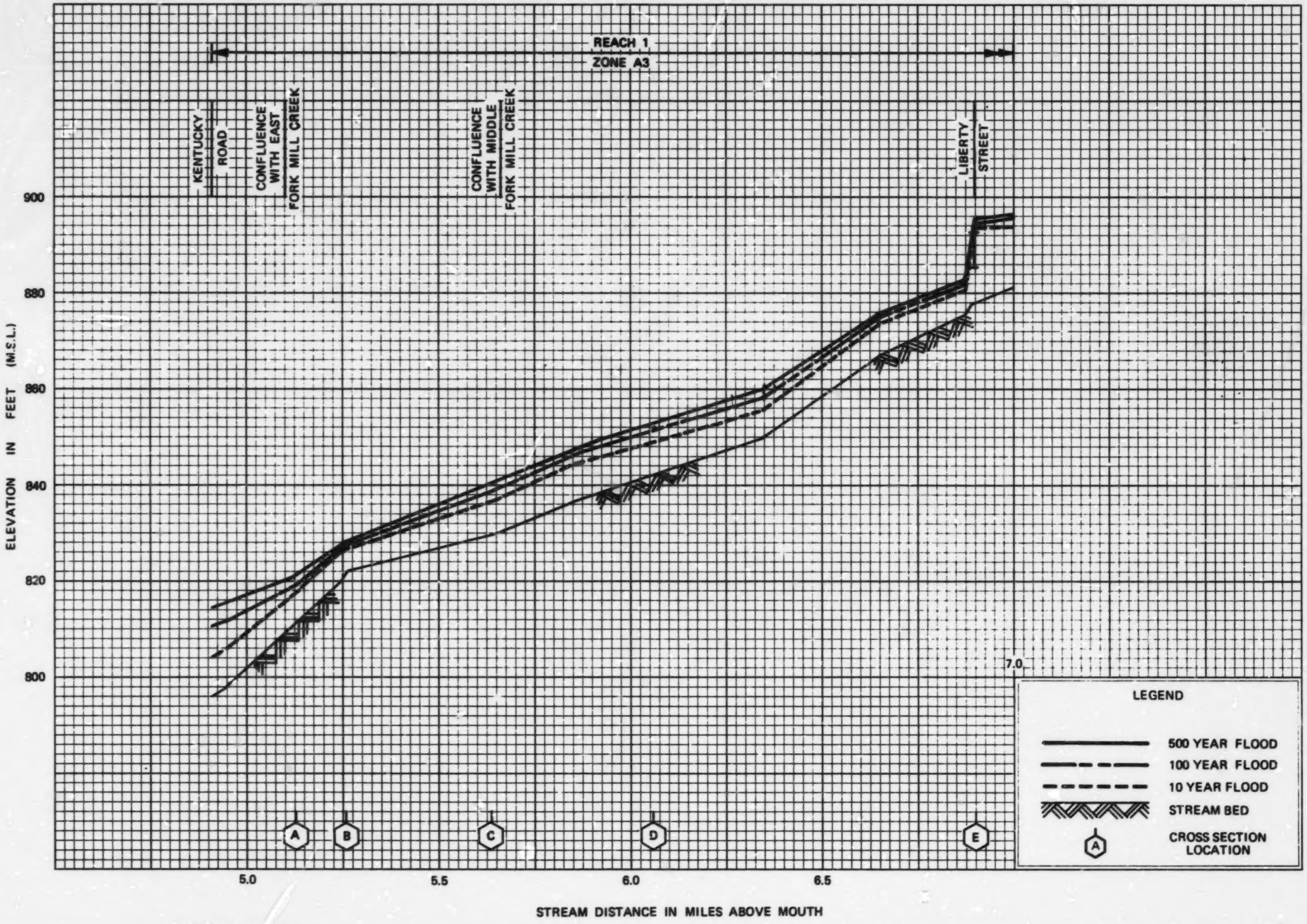
FLOOD PROFILES

NORTH FORK SUGAR CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF INDEPENDENCE, MO
(CLAY AND JACKSON COS.)

05P



FLOOD PROFILES

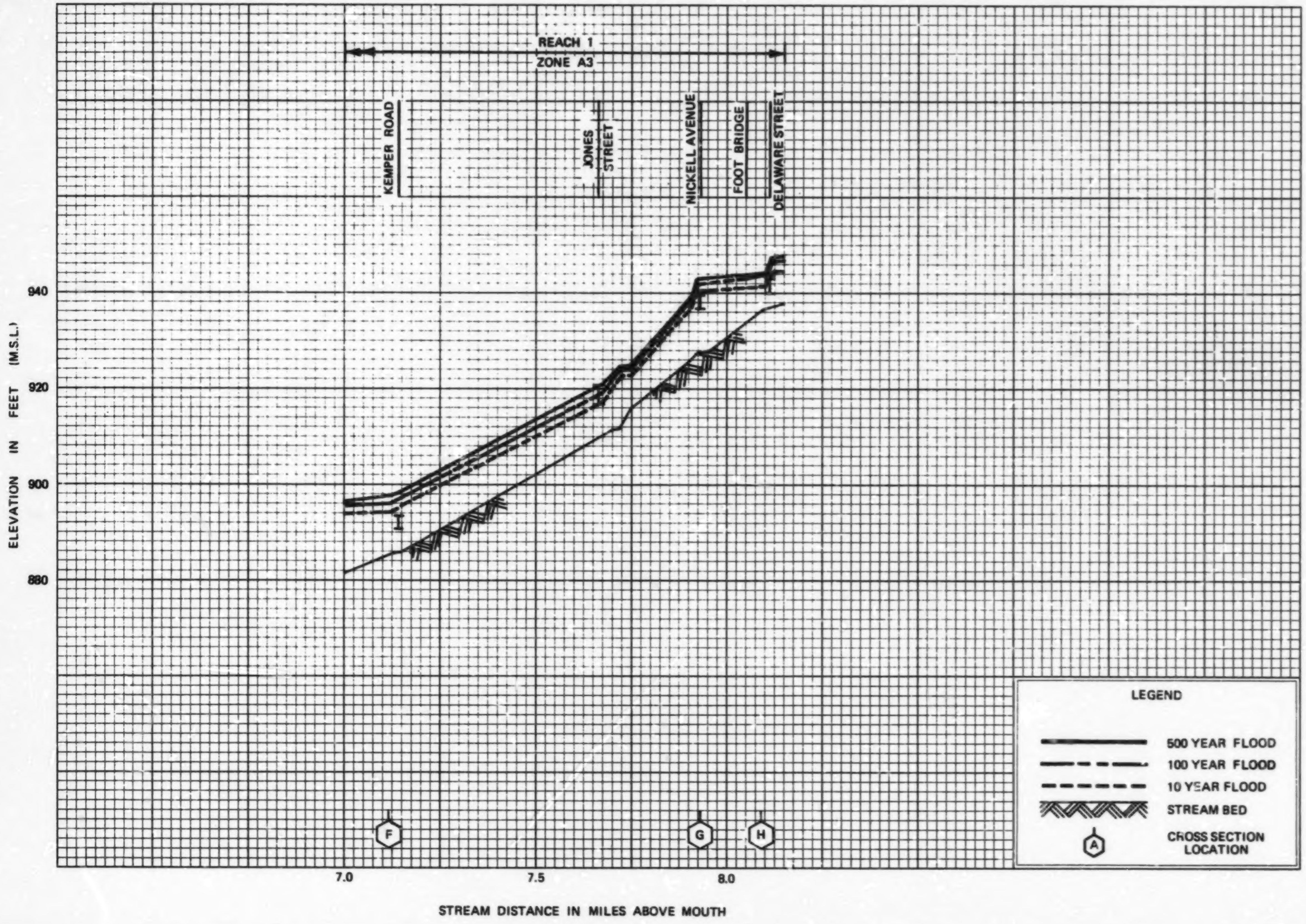
MILL CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF INDEPENDENCE, MO

(CLAY AND JACKSON COS.)

06P



FLOOD PROFILES

MILL CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF INDEPENDENCE, MO
(CLAY AND JACKSON COS.)

07P

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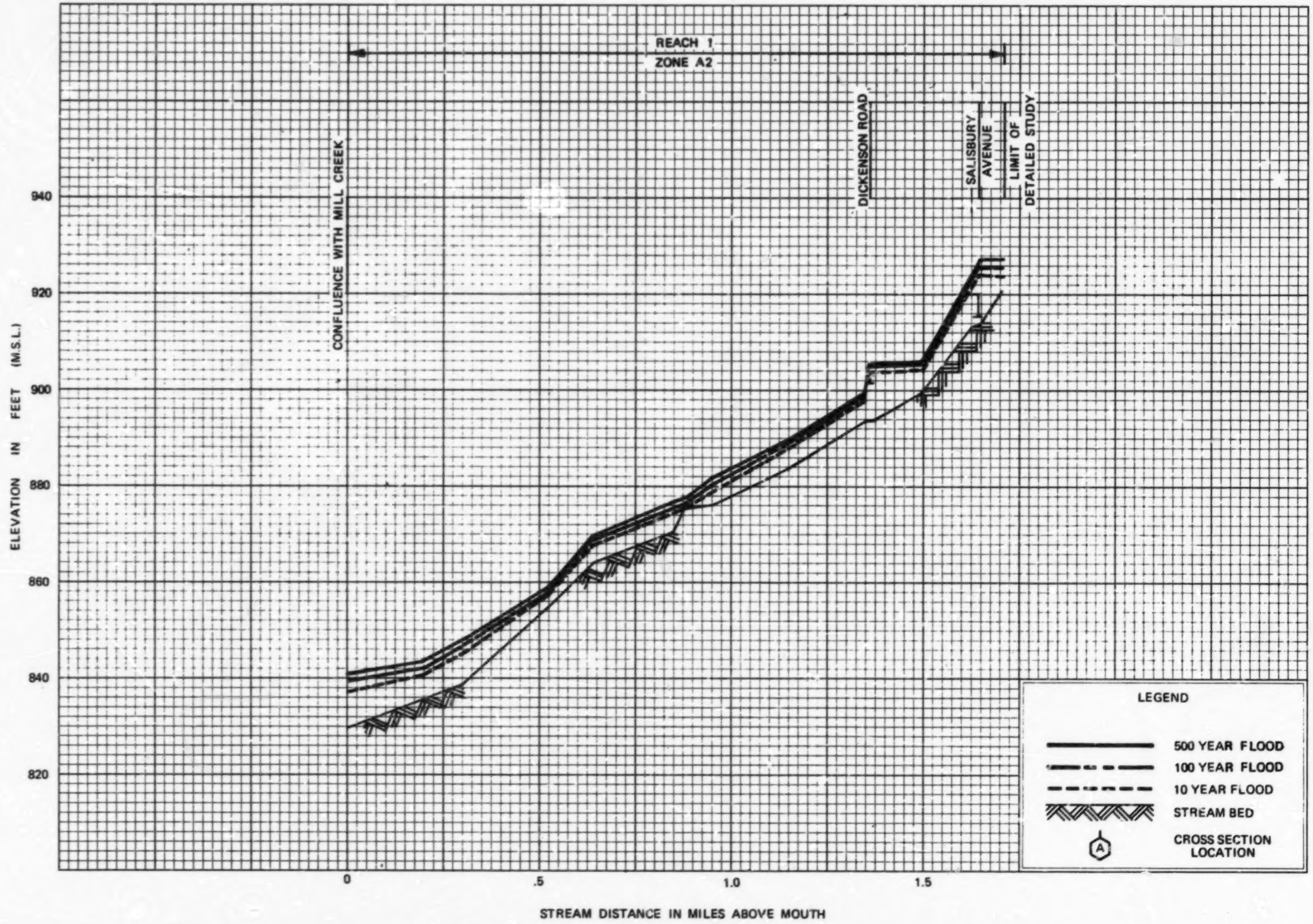

FLOOD PROFILES

MIDDLE FORK MILL CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF INDEPENDENCE, MO
(CLAY AND JACKSON COS.)

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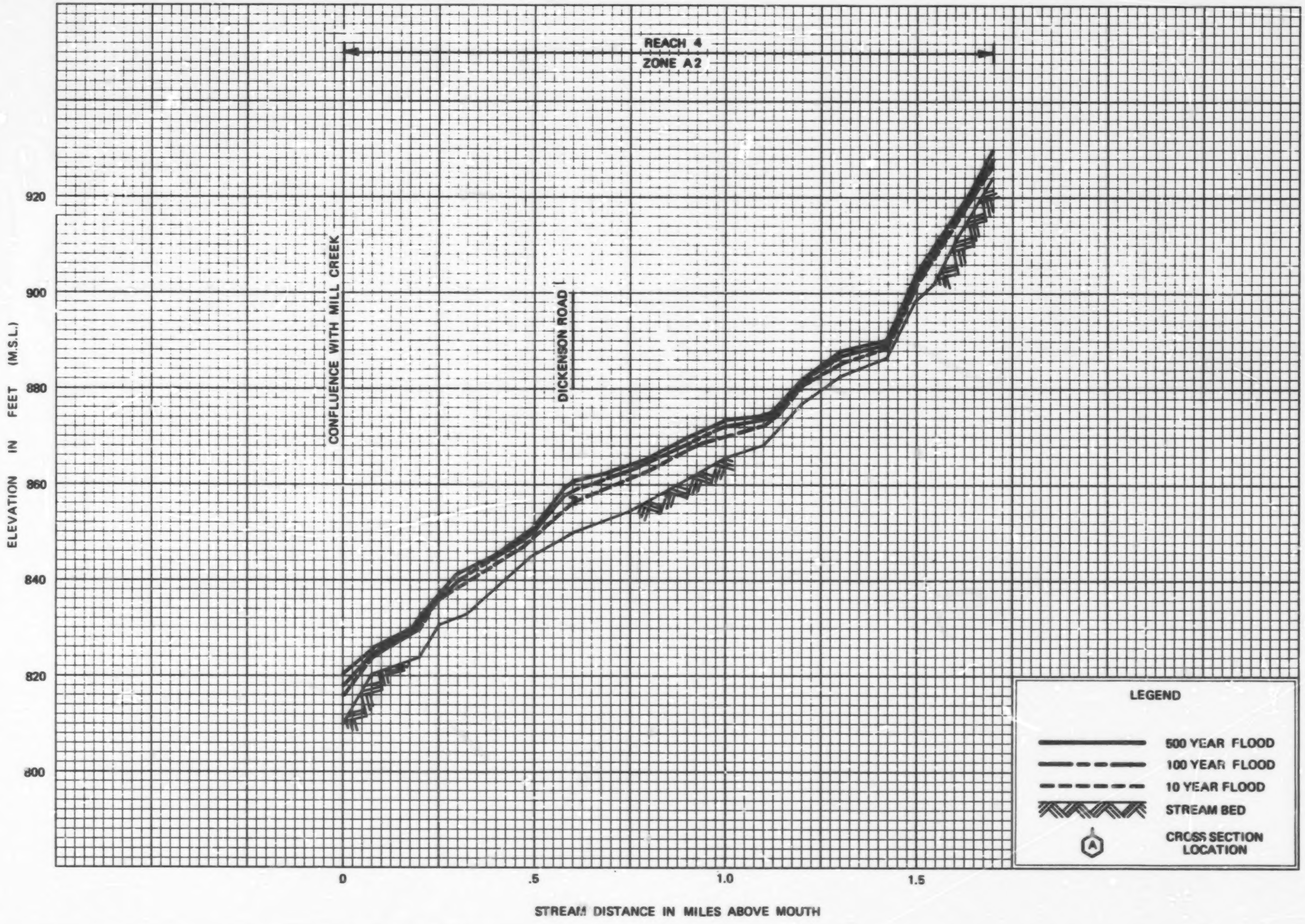


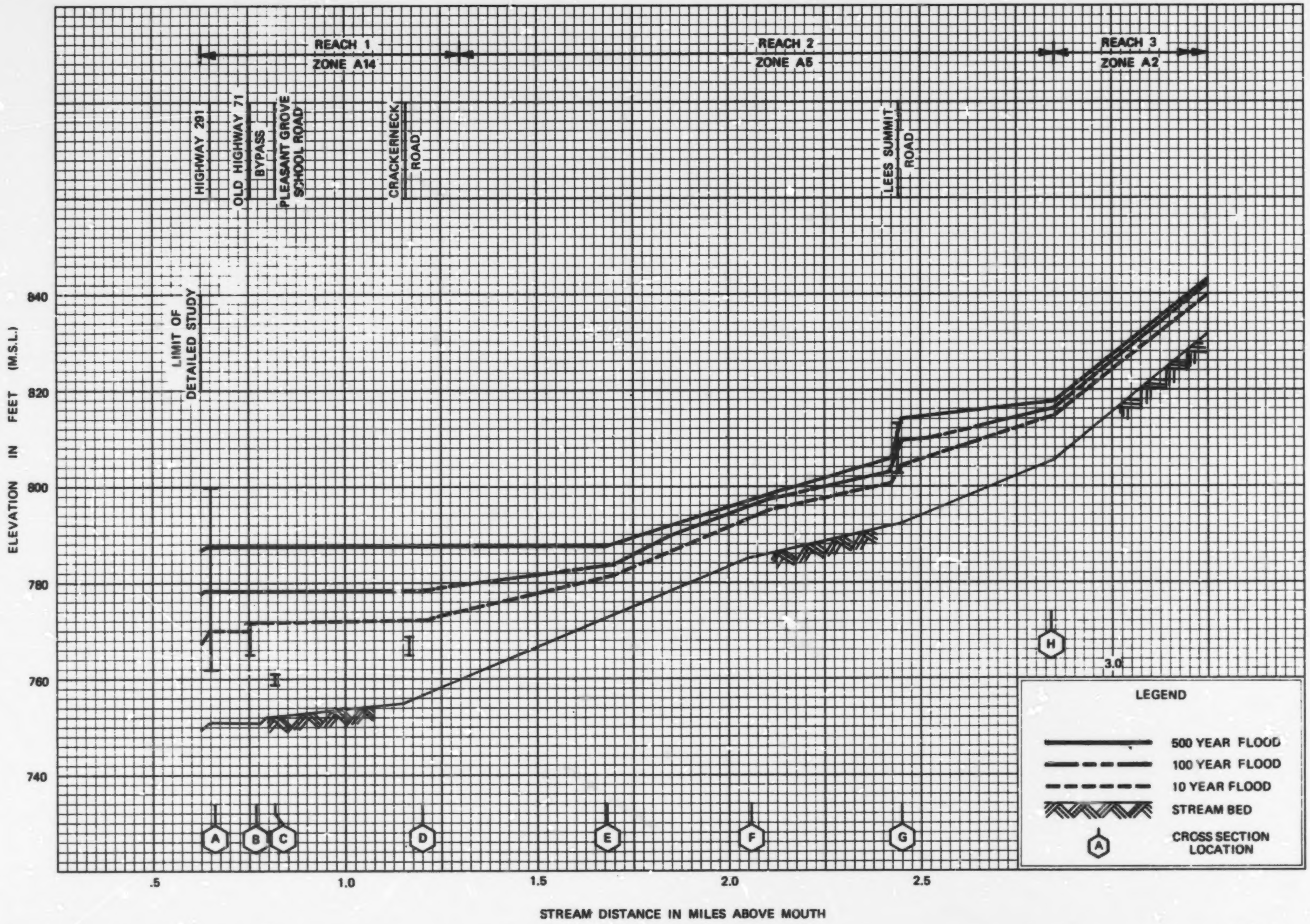
FLOOD PROFILES

EAST FORK MILL CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF INDEPENDENCE, MO
(CLAY AND JACKSON COS.)

09P



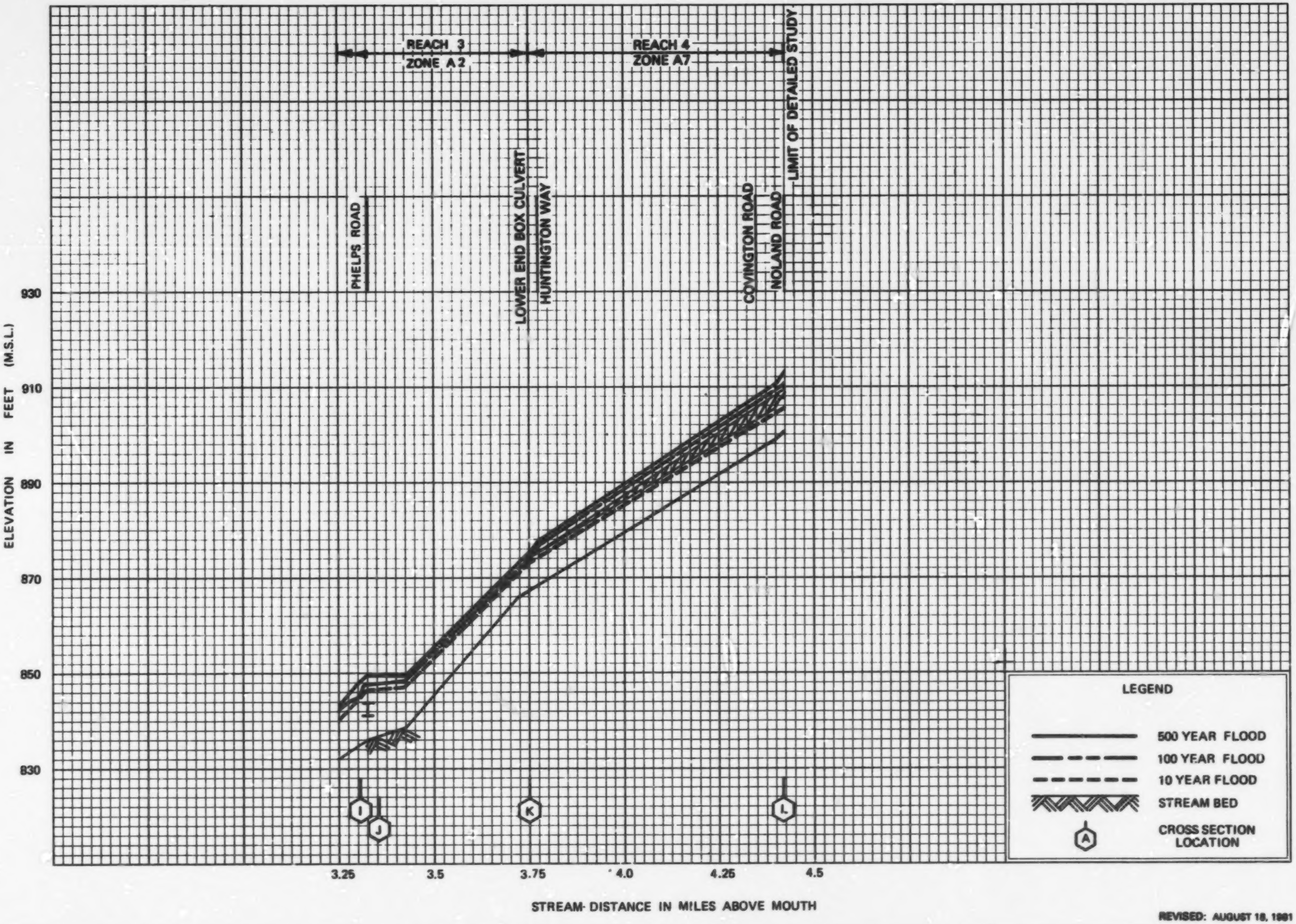
FLOOD PROFILES

ADAIR CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF INDEPENDENCE, MO
(CLAY AND JACKSON COS.)

10P



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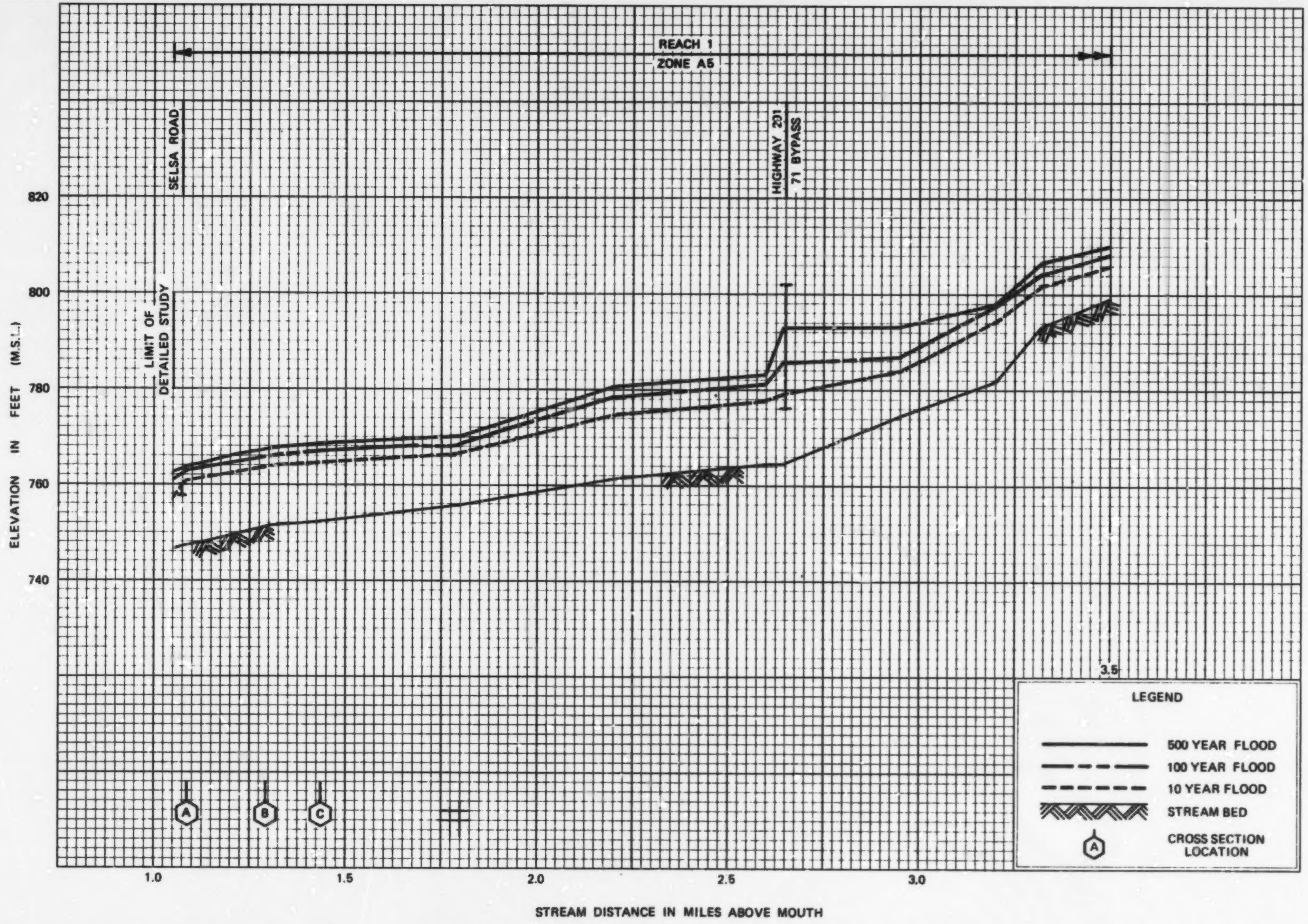
FLOOD PROFILES

ADAIR CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF INDEPENDENCE, MO
(CLAY AND JACKSON COS.)

11P



FLOOD PROFILES

CRACKERNECK CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF INDEPENDENCE, MO
(CLAY AND JACKSON COS.)

12P

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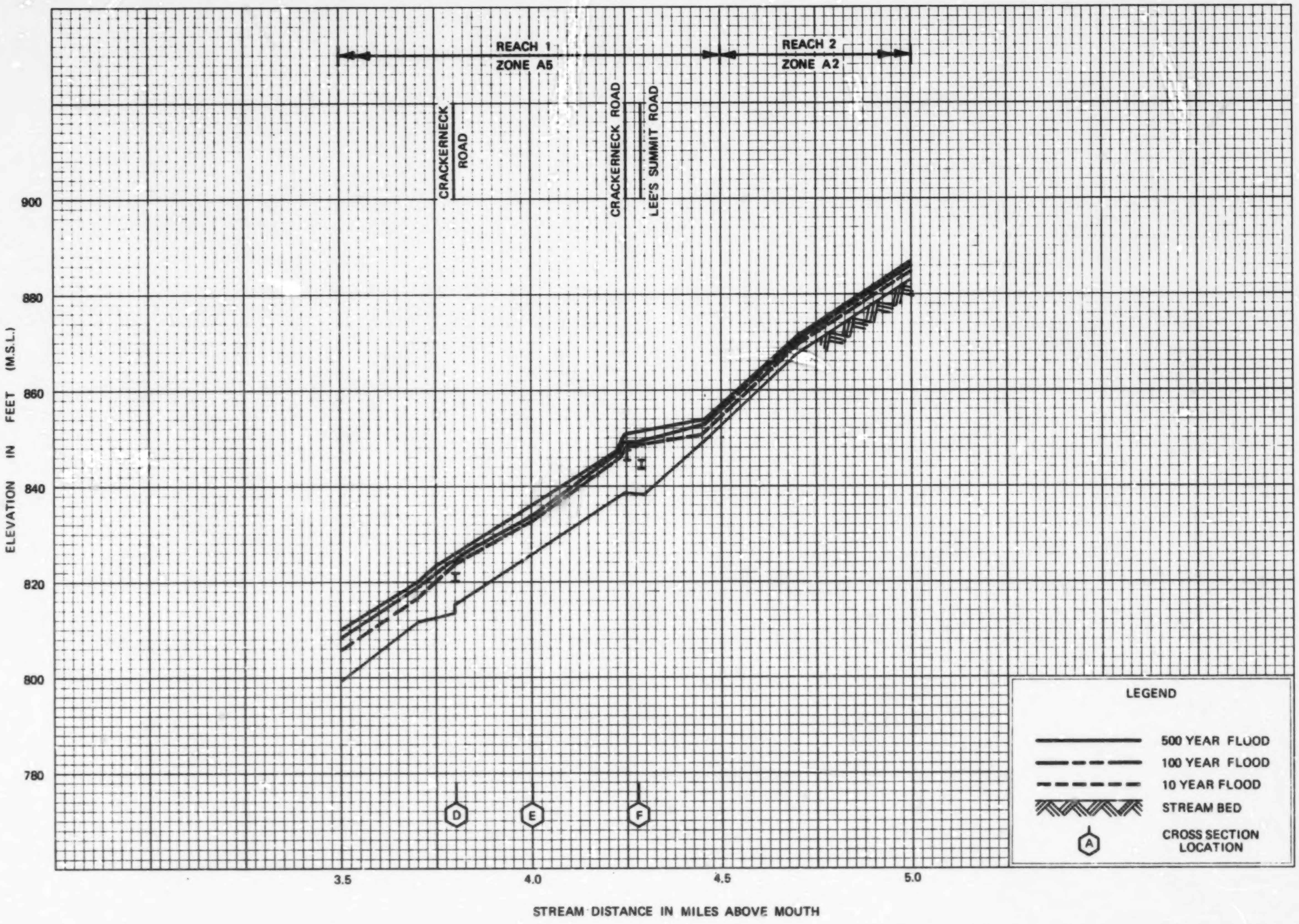

FLOOD PROFILES

CRACKERNECK CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF INDEPENDENCE, MO
(CLAY AND JACKSON COS.)

13P

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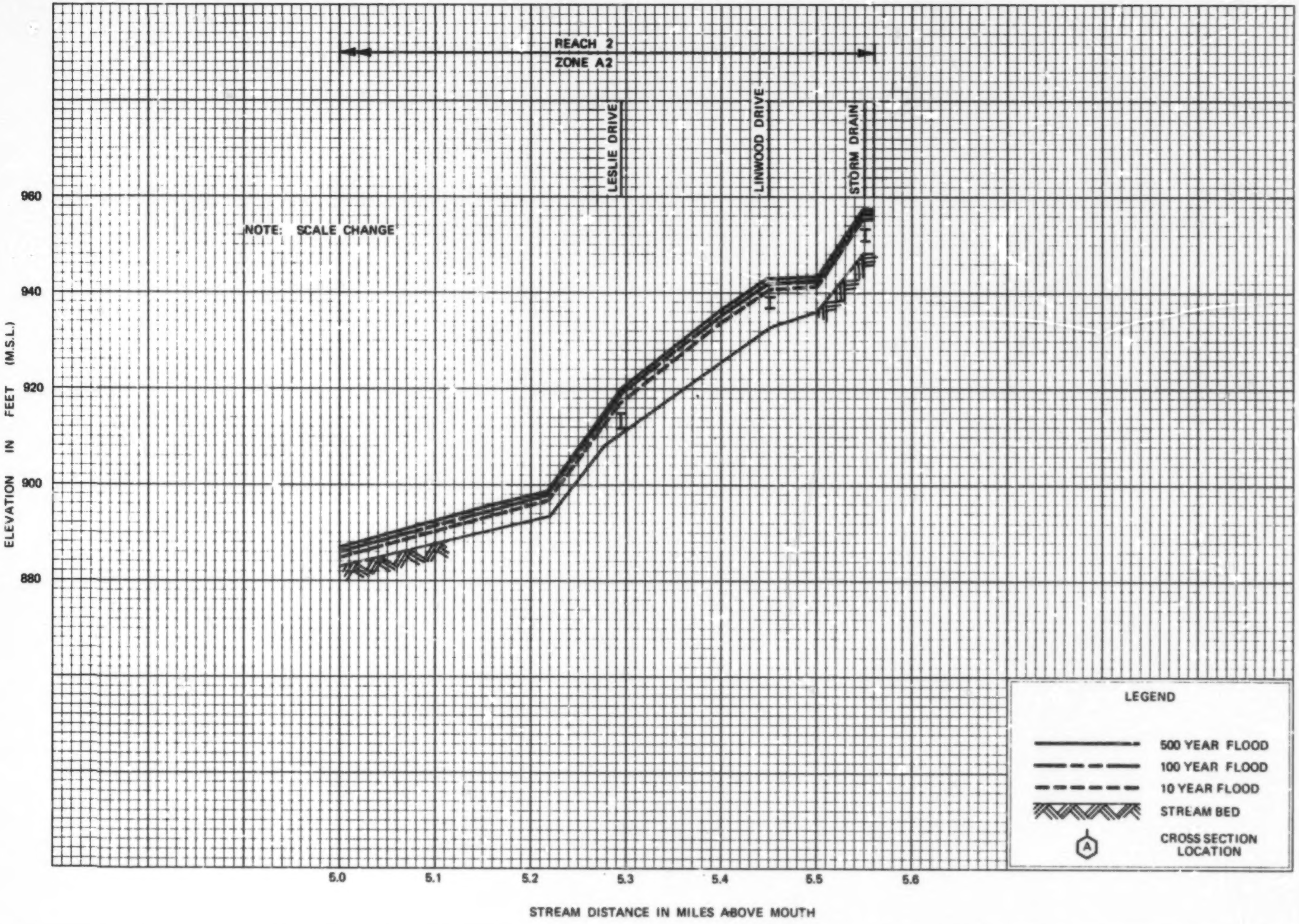


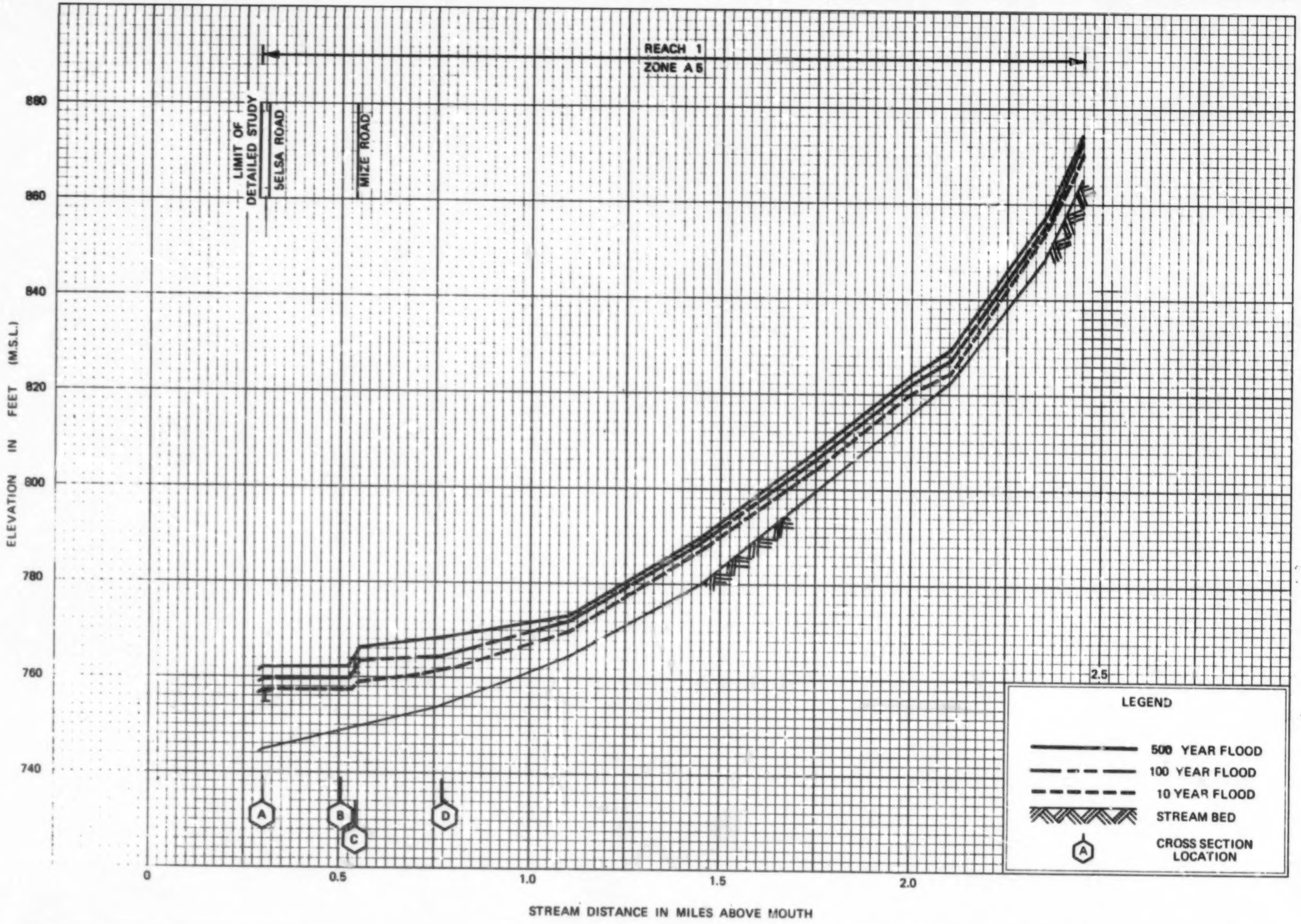
FLOOD PROFILES

CRACKERNECK CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF INDEPENDENCE, MO
(CLAY AND JACKSON COS.)

14P



FLOOD PROFILES

NORTH FORK CRACKERNECK CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF INDEPENDENCE, MO
(CLAY AND JACKSON COS.)

15 P

44

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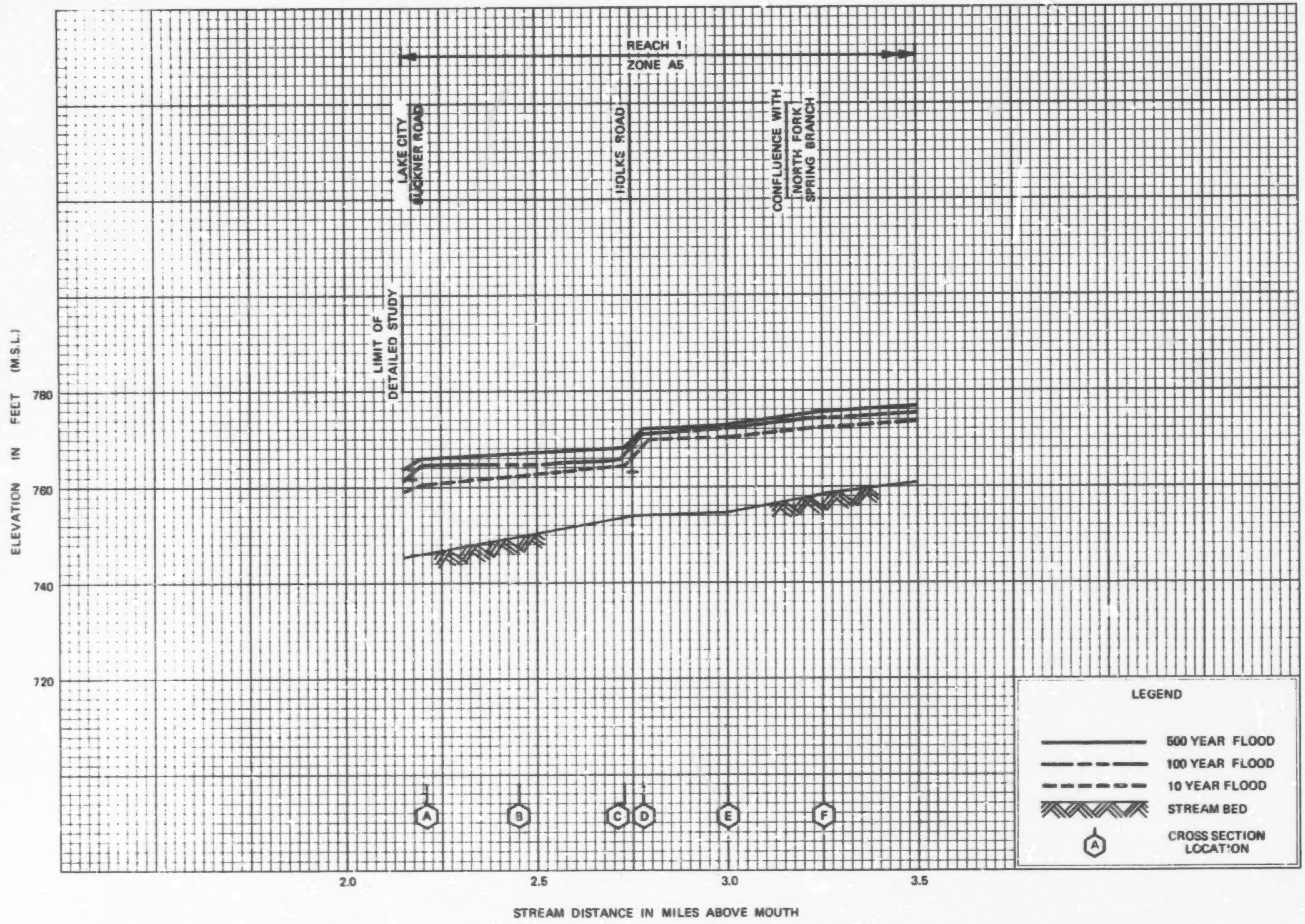

FLOOD PROFILES

SPRING BRANCH

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF INDEPENDENCE, MO
(CLAY AND JACKSON COS.)

16P

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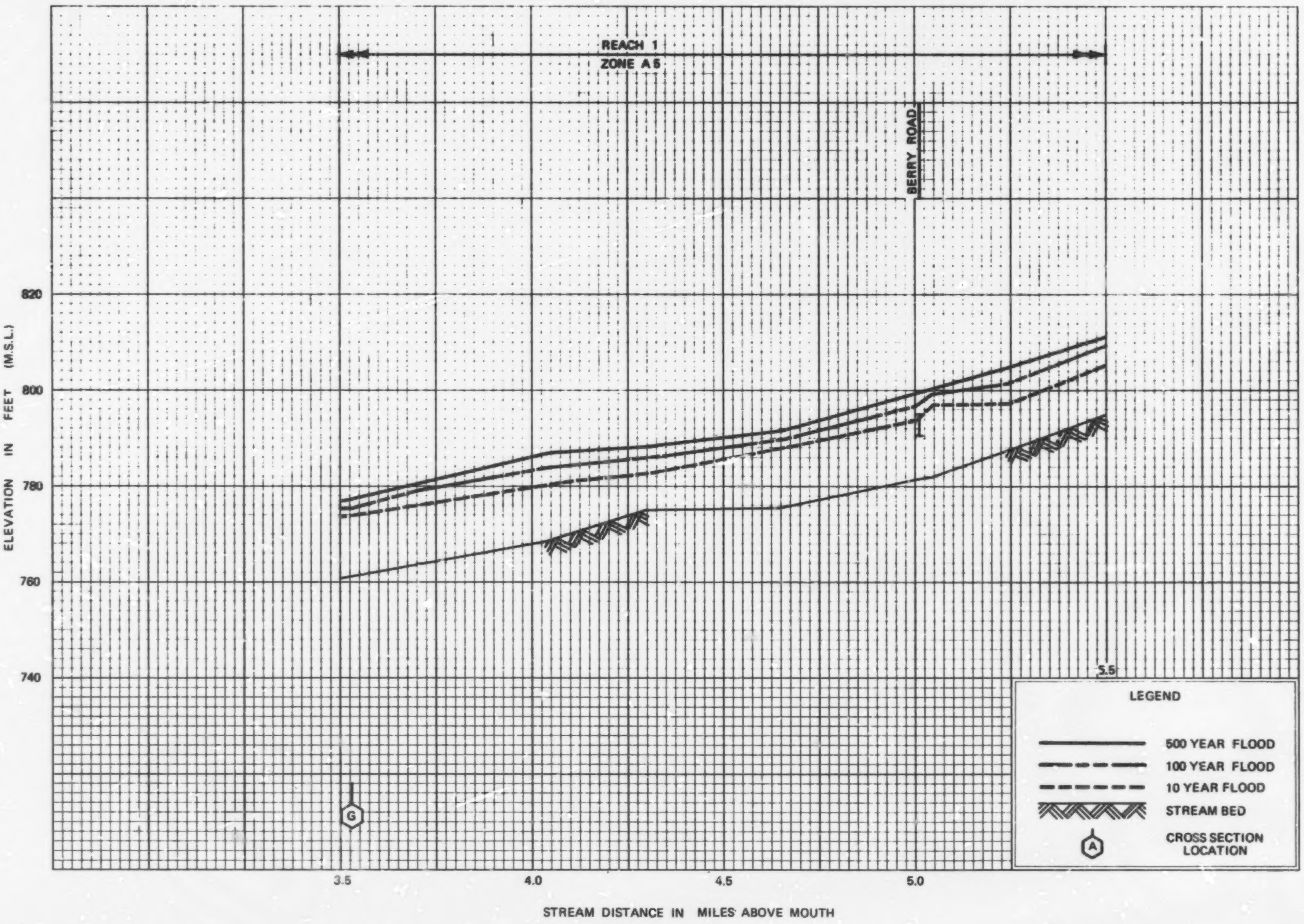

FLOOD PROFILES

SPRING BRANCH

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF INDEPENDENCE, MO
(CLAY AND JACKSON COS.)

17P

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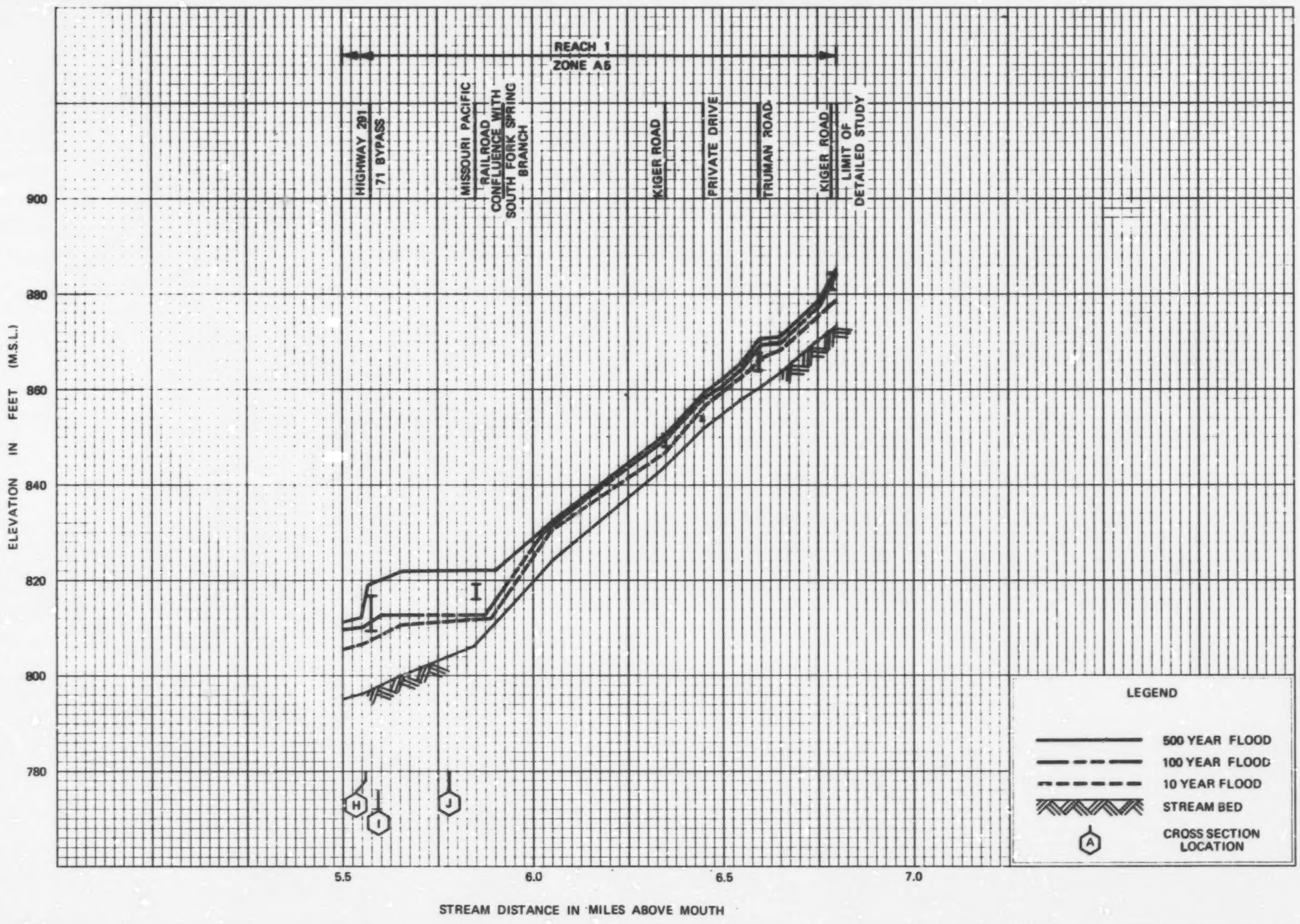

FLOOD PROFILES

SPRING BRANCH

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF INDEPENDENCE, MO
(CLAY AND JACKSON COS.)

18P

47

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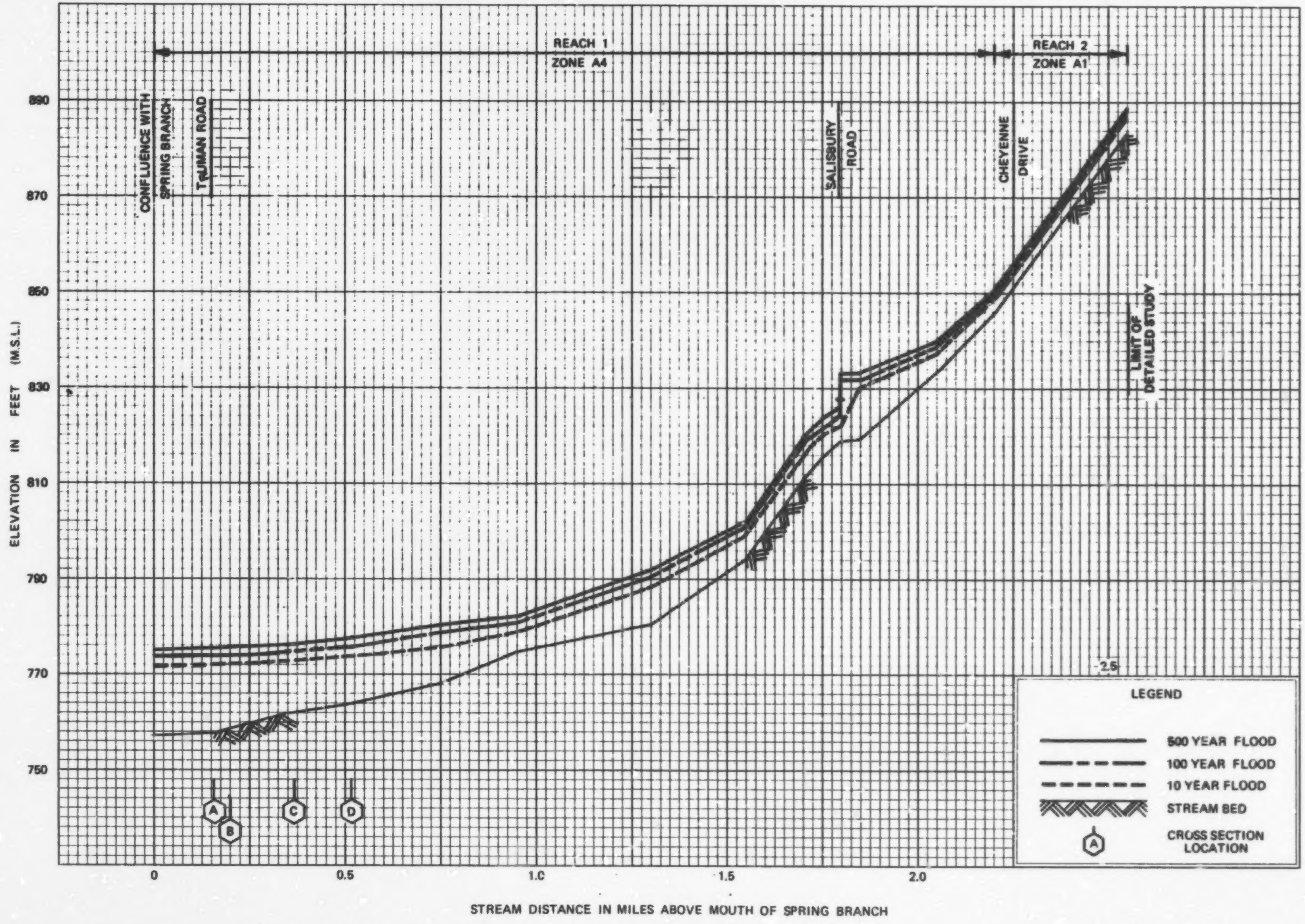

FLOOD PROFILES

NORTH FORK SPRING BRANCH

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF INDEPENDENCE, MO
(CLAY AND JACKSON COS.)

19P

48

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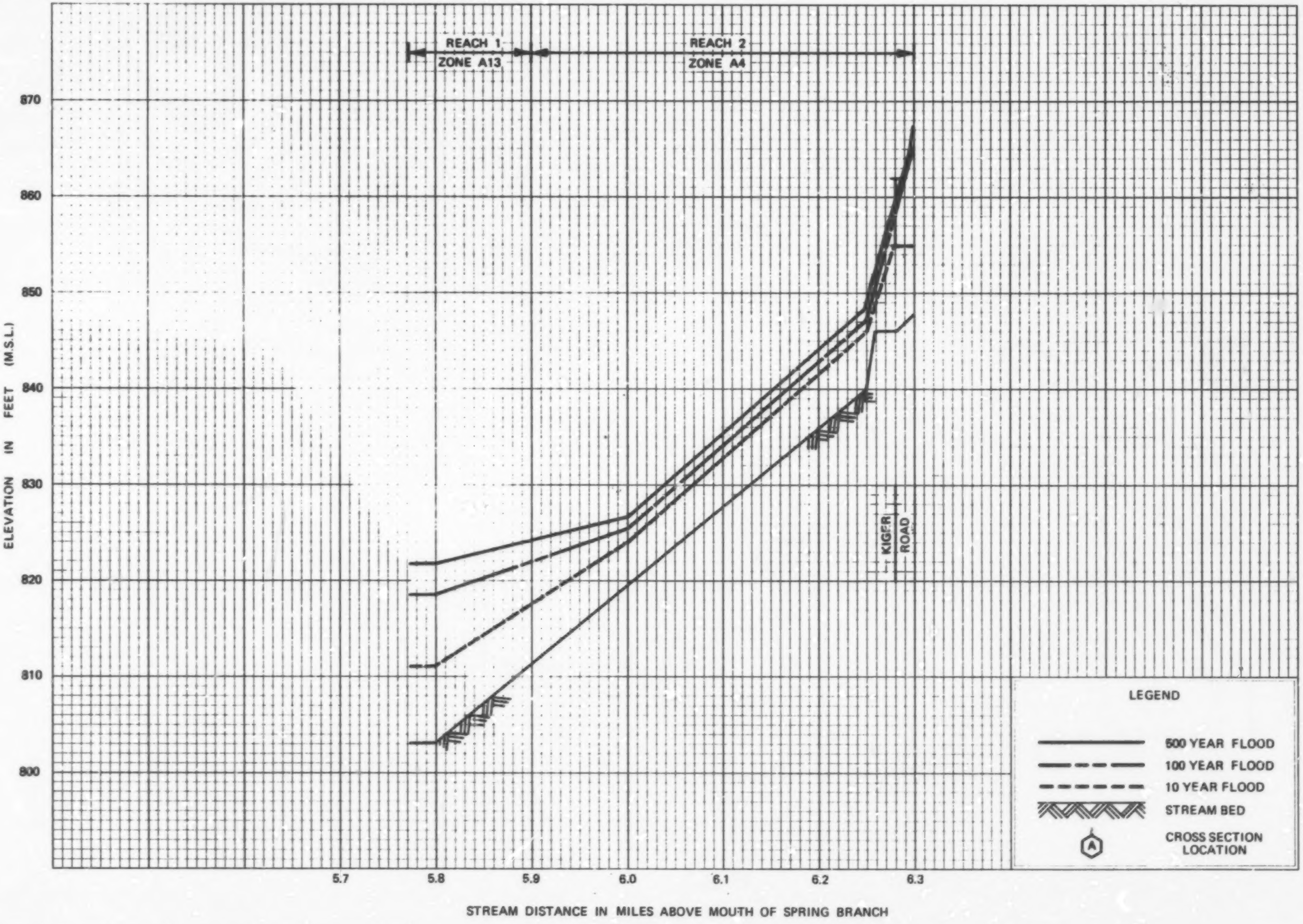


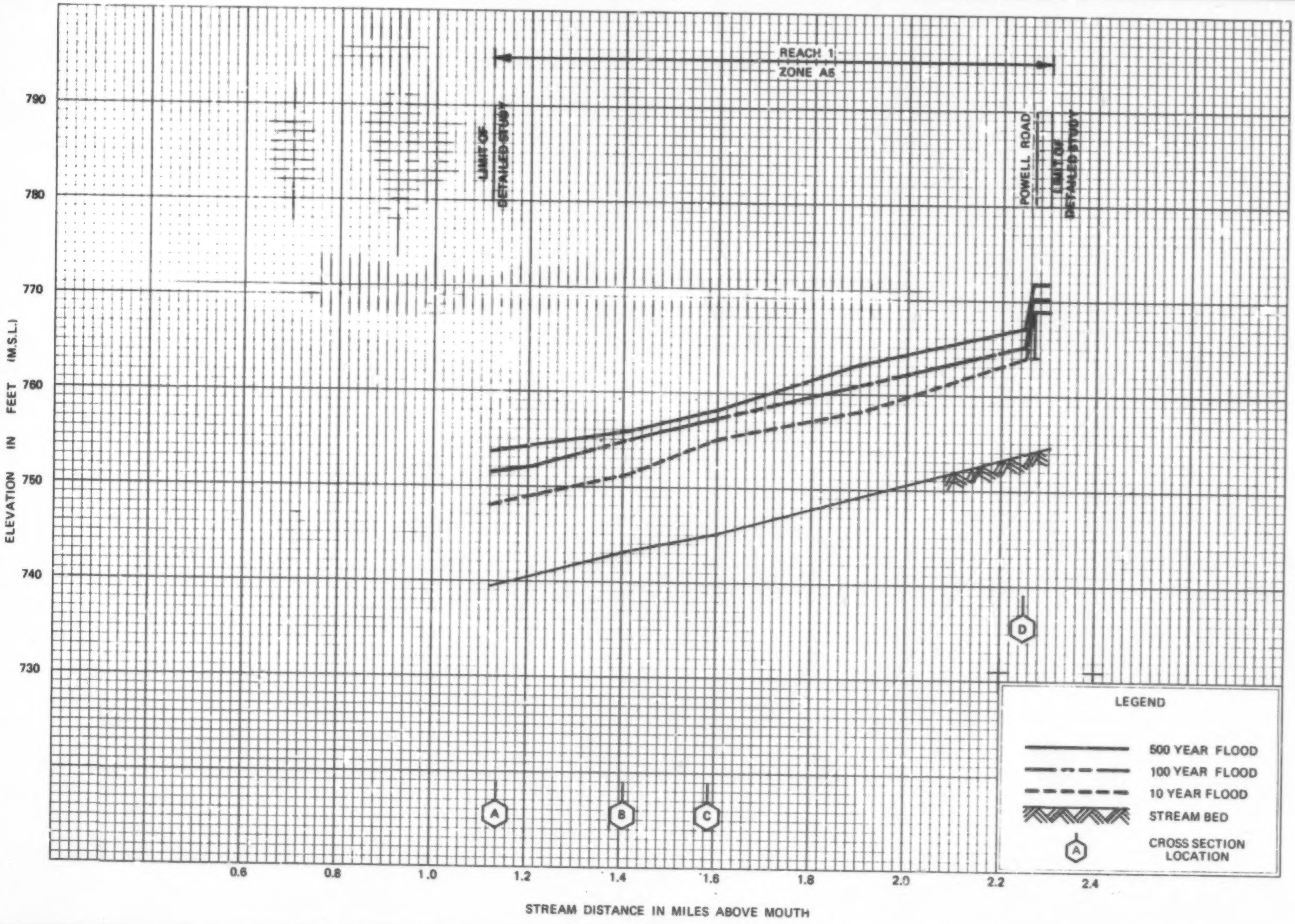
FLOOD PROFILES

SOUTH FORK SPRING BRANCH

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF INDEPENDENCE, MO
(CLAY AND JACKSON COS.)

20P



FLOOD PROFILES

BUNDSCHU CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF INDEPENDENCE, MO
(CLAY AND JACKSON COS.)

21P

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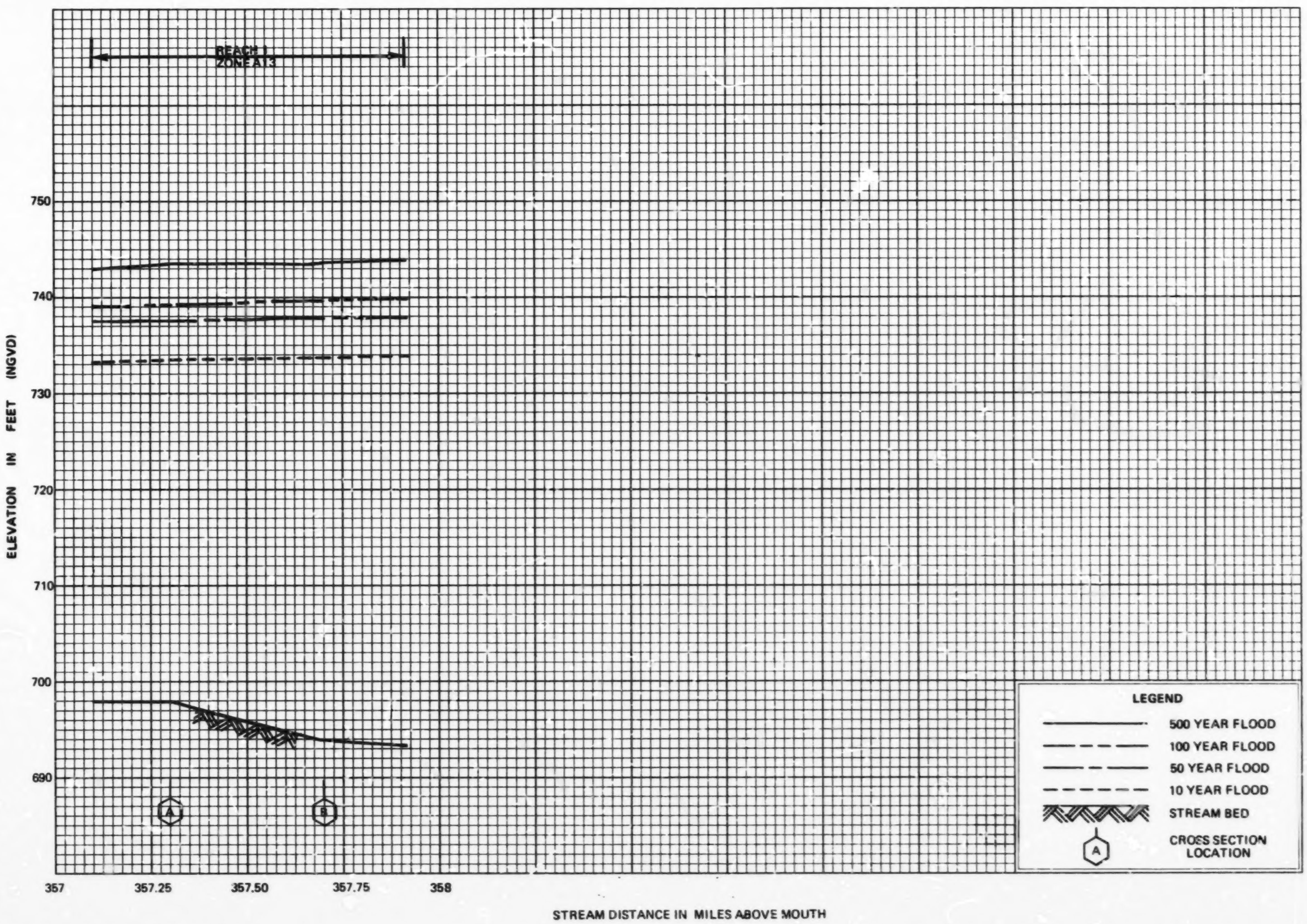

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF INDEPENDENCE, MO.
(CLAY AND JACKSON COS.)

FLOOD PROFILES

MISSOURI RIVER

22P